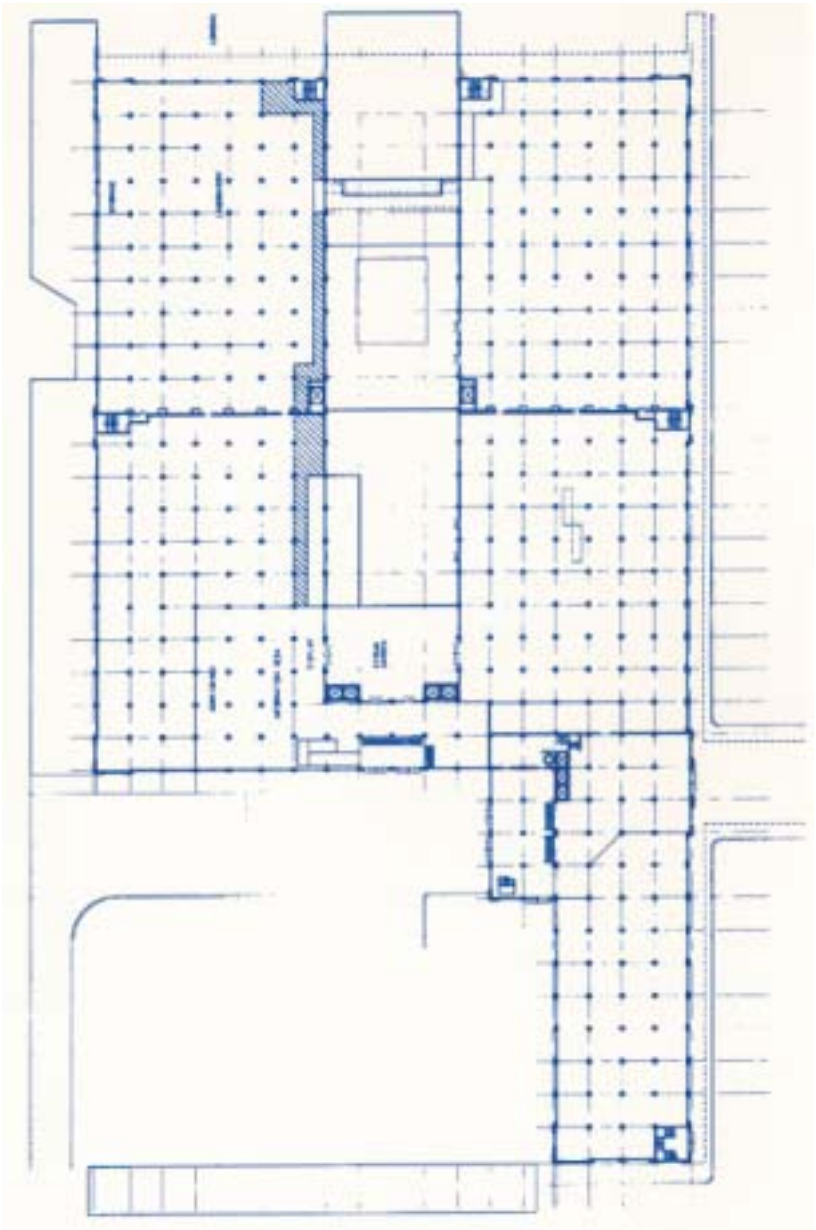
2001 Maryland Green Building Council

High Efficiency Green Buildings

Program



Parris N. Glendening
Governor

Kathleen Kennedy Townsend
Lt. Governor

Peta N. Richkus
Chair, Green Building Council

Richard F. Pecora
Deputy Secretary

Maryland first initiated its Green Building Program in 1997 in conjunction with Governor Parris N. Glendening's Smart Growth and Neighborhood Conservation initiatives. Working with numerous partners, the program's goal has been to increase the awareness and use of environmentally friendly and responsible building practices, materials and site designs that produce comfortable, affordable and healthy buildings. With the "High Efficiency" Green Building policy for new state construction Projects that is a result of the Governor's Executive Order 01.01.2001.02, state buildings will be designed to have lower energy consumption, produce less waste, and reduce the impact on the land.

In an effort to grow smarter, to live more in balance with our environment, and to help protect and restore the Chesapeake Bay, and determined to lead by example and mindful of the influence the State's actions have in the marketplace, Governor Glendening established the Maryland Green Buildings Council to institutionalize the "greening" of the State's own capital investment activities. By adapting the USGreen Building Council's LEED TM Program for Maryland and establishing a measurement process to ensure that the State's capital dollars are spent in a manner consistent with sustainable design, Maryland continues its leadership position in protecting the environment and in providing healthy, productive environments. All the better to enhance the Quality of Life available in Maryland.

"State government has a responsibility to maximize our resources and minimize the impact on the environment. While Smart Growth focuses on *where* we build, the green building initiative focuses on *how* we build. It is the next step in our efforts to grow smarter, live more in balance with our environment and help protect and restore the Chesapeake Bay."

Parris N. Glendening,

Governor

Table of Contents

Maryland Green Buildings Council Membership

Chair

Peta N. Richkus, Secretary
Department of General Services
Phone: 410-767-4960E-mail: prichkus@dgs.state.md.us

Ex-Officio Members

Department of Budget and Management, T. Eloise Foster, Secretary

Phone: 410-260-7041 E-mail: efoster@dbm.state.md.us
Designee: Fred Mason, Capital Budget Analyst
Phone: 410-767-4524 Fax: 410-767-4169 E-mail: fmason@dbm.state.md.us

Department of Environment, Jane T. Nishida, Secretary

Phone: 410-631-3084 Fax: 410-631-3888 E-mail: jnishida@mde.state.md.us
Designee: Merrylin Zaw-Mon, Deputy Secretary
Phone: 410-631-4187 Fax: 410-631-3936 E-mail: mzaw-mon@mde.state.md.us
Staff Support: Heather Woods, Legislative Liaison
Phone: 410-631-3056 E-mail: hwoods@mde.state.md.us

Department of Natural Resources, J. Charles Fox, Secretary

Phone: 410-260-8101 E-mail: cfox@dnr.state.md.us
Designee: Mark Bundy, Director, Education, Bay Policy & Growth Management
Phone: 410-260-8720 Fax: 410-260-8709 E-mail: mbundy@dnr.state.md.us
Additional contact support staff:
Dan Brower, DNR Green Building Coordinator
Phone: 410-260-8912 E-mail: dbrower@dnr.state.md.us
Sean McGuire, Tributary Team Coordinator
Phone: 410-260-8727 E-mail: smcguire@dnr.state.md.us

Public Safety & Correctional Services, Stuart O. Simms, Secretary

Phone: 410-339-5004 E-mail: simmsso@ns1.dpscs.state.md.us
Designee: John Hergenroeder, Director of Property Management Services
Phone: 410-318-6186 Fax: 410-764-5283 E-mail: jhergenroeder@dpscs.state.md.us

Department of Transportation, John P. Porcari, Secretary

Phone: 410-865-1000 E-mail: jporcari@mdot.state.md.us
Designee: Dick Lyons, Director, Facility Operations, MDOT
Phone: 410-865-1139 Fax: 410-865-1343 E-mail: rlyons@mdot.state.md.us
Additional Staff Support: Nat Bottigheimer

Department of Housing & Community Devel., Raymond Skinner, Secretary

Phone: 410-514-7001 E-mail: skinner@dhcd.state.md.us
Designee: James C. Hanna, Director, Codes Administration
Phone: 410-514-7212 Fax: 410-987-8902 E-mail: hanna@dhcd.state.md.us
Additional contact support staff: Kanti Patel, P.E.
Phone: 410-514-7213 Fax: 410-987-8902 E-mail: kpatel@dhcd.state.md.us

Department of Planning, Roy Kienitz, Secretary

Phone: 410-767-4510 E-mail: rkienitz@mdp.state.md.us
Designee: Susan Van Buren, ASLA
Phone: 410-767-4554 Fax: 410-767-4480 E-mail: svanburen@mdp.state.md.us
Alternate: Deborah Weller
Ph: 410-767-4561 Fax: 410-767-4480 E-mail: dweller@mdp.state.md.us

Maryland Energy Administration, Director Frederick H. Hoover, Jr., Esquire

Phone: 410-260-7511 E-mail: fhoover@energy.state.md.us
Designee: Geraldine A. Nicholson, Assistant Director
Phone: 410-260-7207 Fax: 410-974-2250 or 410-974-2875 E-mail: gnicholson@energy.state.md.us
Alternate: Christina Mudd
Phone: 410-260-7184 Fax: 410-974-2250 or 410-974-2875 E-mail: cmudd@energy.state.md.us

Public School Construction Program

Designee: Dr. Yale Stenzler, Executive Director
Phone: 410-767-0610 Fax: 410-333-6522 E-mail: ystenzler@msde.state.md.us
Additional Contact/ Support:
Sarah Lancaster
Phone: 410-767-0611 Fax: 410-333-6522 E-mail: slancast@msde.state.md.us

University System of Maryland, Vice Chancellor Charles R. Middleton

Phone: 301-445-1992 E-mail: crm@usmd.edu
Designee: Professor Carl Bovill, Associate Professor, School of Architecture
Phone: 301-405-6305 Fax: 301-314-9583 E-mail: cb116@umail.umd.edu

Appointed Members

Ms. Florence B. Kurdle, Director, Local Government and Constituent Affairs, Constellation Energy Group
Phone: 410-269-5284 Fax: 410-269-5289 E-mail: Florence.B.Kurdle@constellation.com
47 State Circle, Suite 403
Annapolis MD 21401

Ms. Sallye E. Perrin, Vice President and Director, DMJM & Harris
Phone: 410-637-1730 Fax: 410-576-1305 E-mail: sallye.perrin@dmjmharris.com
DMJM
1 South Street, Suite 2200
Baltimore MD 21201

Brian Perlberg, Esquire Howard County Council
Phone: 410-313-3122 Fax: 410-313-3297 E-mail: bperlberg@co.ho.md.us
7665 B Coachlight Lane bperlberg@hotmail.com
Ellicott City, Maryland 21043

James W. Morrow, Esquire, American Federation of Teachers
Phone: 410-295-3349 Fax: 410-295-3399 E-mail: jmorrow@aft-maryland.org
275 West Street, Suite 108
Annapolis MD 21401

Mr. William G. Reed, Natural Logic, Inc.
Phone: 301-654-3323 Fax: 301-654-5713 E-mail: wgreed@earthlink.net
4233 Leland Street
Chevy Chase MD 20815

Ms. Lavonzella Siggers
Phone: 410-749-2362 Fax: 410-341-673 E-mail: lsiggers@ci.salisbury.md.us
127 Second Street
Salisbury MD 21801

DGS Staff

Stephen Gilliss, RA, technical support E-mail: stephen.gilliss@dgs.state.md.us
Phone: 410-767-4675 Fax: 410-333-7558

Jerry Krasnick, administration
Phone: 410-767-8347 (Balto); 410-260-6014 (Annap) Pager: 410-938-7635
Fax: 410-333-5730 E-mail: jerry.krasnick@dgs.state.md.us

Heather Brautman, administration
Phone: 410-767-4606 Fax: 410-333-5730 E-mail: heather.brautman@dgs.state.md.us

Maryland Green Buildings Council Subcommittees

High Efficiency Green Buildings Subcommittee

Areas of Responsibility:
High Efficiency Green Buildings
Efficient Product Purchase Goal

1. **Stephen Gilliss, Chair** - DGS	410-767-4675	stephen.gilliss@dgs.state.md.us
2. Yale Stenzler- Public Schools	410-767-0610	ystenzler@msde.state.md.us
3. Fred Mason III - DBM	410-767-4524	fmason@dbm.state.md.us
4. Carl Bovill- UM	301-405-6305	cb116@umail.umd.edu
5. John Hergenroeder - DPSCS	410-318-6186	jhergenroeder@dpscs.state.md.us
6. Dick Lyons - MDOT	410-865-1139	rlyons@mdot.state.md.us
7. Jim Hanna - DHCD	410-514-7212	hanna@dhcd.state.md.us
8. Heather Woods - MDE	410-631-3056	hwoods@mde.state.md.us
9. Susan Van Buren - MDP	410-767-4554	svanburen@mdp.state.md.us
10. Shari Jackson - Amer Plastics Coun.	703-253-0627	shari_jackson@plastics.org
11. Tim LaRonde - MEA	410-260-7539	tlaronde@energy.state.md.us
12. William Reed - Natural Logic	301-654-3323	wgreed@earthlink.net
13. Norman Heathcote	410-323-0600	nheath@bkma.com
14. Mark Bundy - DNR	410-260-8720	mbundy@dnr.state.md.us
15. Dan Brower - DNR	410-260-8912	dbrower@dnr.state.md.us
16. Caroline Hazard - D&R	301-588-9387	chazard@drintl.com
17. Christopher Hutson	410-528-8600	chutson@rtkl.com
18. Gerri Nicholson- MEA	410-260-7207	gnicholson@energy.state.md.us

Energy Subcommittee

Areas of Responsibility:
Clean Energy Procurement
Energy Efficiency Improvement Goal
Renewable Energy Project Goal
Greenhouse Gas Reduction Plan

1. **Gerri Nicholson, Chair** - MEA	410-260-7207	gnicholson@energy.state.md.us
2. Ward Morrow- Amer. Fed. Teach	410-295-3349	wardesq@aol.com
3. Sean McGuire - DNR	410-260-8727	smcguire@dnr.state.md.us
4. Gene Higa- MDE	410-631-3240	ghiga@mde.state.md.us
5. Duane King- MDE	410-631-4835	dking@mde.state.md.us

Alternative Fuel Vehicles Subcommittee

Area of Responsibility:
Alternative Fuel Vehicles Goal

1. **Nate Bottigheimer Chair** - MDOT	410-865-1285	nbottigheimer@mdot.state.us
2. Brian Perlberg - Howard Cty. Coun.	410-313-3122	bperlberg@co.ho.md.us
3. Candice Seward - DGS	410-767-4257	candice.seward@dgs.state.md.us
4. Lavonzella Siggers - City of Salisbury	410-548-3100	lsiggers@ci.salisbury.md.us
5. Ron Lipinski - MDE	410-631-3176	rlipinski@mde.state.md.us

6. Dale Baxter - MEA	410-260-7008	dbaxter@energy.state.md.us
7. Matt Maize - DBM	410-260-7413	mmaize@dbm.state.md.us
8. Dick Lyons - MDOT	410-865-1139	rlyons@mdot.state.md.us

Pollution Prevention Subcommittee

Area of Responsibility:
Pollution Prevention Goal

1. **Rick Collins - Chair** MDE	410-631-3084	rcollins@mde.state.md.us
2. Sallye Perrin- DMJM	410-637-1730	sallye.perrin@dmjmharris.com
3. Lavonzella Siggers - City of Salisbury	410-548-3100	lsiggers@ci.salisbury.md.us
4. Cornellia Pasche Wikar - DNR	410-260-8737	cpaschewikar@dnr.state.md.us
5. Brian Perlberg - Howard Cty.	410-313-3122	bperlberg@hotmail.com
6. Becki Kurdle- CEG	410-269-5284	florence.b.kurdle@constellation.com
7. Heather Woods- MDE	410-631-3056	hwoods@mde.state.md.us
8. Joe Trabert- MDOT	410-865-1129	jtrabert@mdot.state.md.us

Report/format Committee

1. **Mark Bundy, Chair** - DNR	410-260-8720	mbundy@dnr.state.md.us
2. Stephen Gilliss- DGS	410-767-4675	stephen.gillis@dgs.state.md.us

Maryland Green Buildings Council Website:
www.dgs.state.md.us/GreenBuildings/default.htm

Executive Summary

On March 13, 2001 Governor Parris N. Glendening signed **Executive Order 01.01.2001.02** - *Sustaining Maryland's Future with Clean Power, Green Buildings and Energy Efficiency.*

The Order addresses the issue of producing energy with cleaner power sources. It establishes a goal requiring that part of the electricity purchased for use within State facilities comes from Green Power sources. It also creates the Maryland Green Buildings Council (the "Council"). The Council is charged with establishing a High Efficiency Green Buildings Program (the "Program") and providing recommendations on standards and criteria for use by the Program within 180 days. Lastly, it establishes several additional goals related to greater energy efficiency within state facilities. They include the purchase of products in the top 25% in energy efficiency and pollution prevention, and increased flexibility in the procurement of low emission and alternative fuel vehicles.

Maryland first initiated a Green Buildings Program in 1997 in conjunction with Governor Parris N. Glendening's Smart Growth and Neighborhood Conservation initiatives. Working with numerous partners, the program's goal has been to increase the awareness and use of environmentally friendly and responsible building practices, materials, and site designs that produce comfortable, affordable, and healthy buildings. With the "High Efficiency" Green Buildings policy for new state construction projects, established by the Executive Order, State buildings will be designed to have lower energy consumption, produce less waste, and reduce the impact on the land.

In an effort to grow smarter, live more in balance with our environment, improve air quality, help protect and restore the Chesapeake Bay, yet mindful of the influence the State's actions have in the marketplace, Governor Glendening is requiring the State to lead by example. As a result, he established the Maryland Green Buildings Council to institutionalize the "greening" of the State's own facilities.

This represents the Council's 2001 report to the Governor, outlining progress made toward meeting its stated responsibilities. Appendix B, entitled ***"Maryland's High Performance Green Building Program"*** represents the completion of the Council's initial task to establish a High Efficiency Green Buildings Program and provides the details of recommendations on standards and criteria for use by all State agencies.

> "State government has a responsibility to maximize our resources and minimize the impact on the environment. While Smart Growth focuses on *where* we build, the Green Building initiative focuses on *how* we build. It is the next step in our efforts to grow smarter, live more in balance with our environment, and help protect and restore the Chesapeake Bay."
>
> *Parris N. Glendening*

The Maryland Green Buildings Council (MGBC) met monthly and subcommittees met more frequently. The results of these efforts are the following recommendations:

High Efficiency Green Buildings

Recommendation #1: Beginning November 1, 2001, all State owned and leased capital projects funded for design in FY 2002 that have not initiated the Request for Proposal (RFP) for an architect and engineering (A/E) contract shall comply with the High Efficiency Green Buildings Program. Development teams for FY 2002 projects that have already selected the A/E contract and projects funded prior to FY 2002 and are currently in design shall review projects and shall identify Green Building features that can, where practical, be included. All future projects shall comply with the program.

Recommendation #2: Maryland will adopt the Silver Rating of the current version of the U.S. Green Building Council's LEED™ Green Building Rating System as the minimum standard for all new facilities eligible under this Program which are owned or leased by State agencies. This rating forms the basis for the criteria outlined in the accompanying ***"Maryland High Performance Green Building Program."*** Projects are encouraged to strive for the Gold Rating wherever possible.

Recommendation #3: The minimum size for projects required to be LEED™ Silver certified is 7,500 occupied gross square feet for new construction and renovations and 5,000 occupied net square feet for leased projects. Certain utility type or unoccupied building types will not be required to be LEED™ Silver certified.

Recommendation #4: Encourage the use of Green Building principles for projects which are smaller than the minimum size requirements and for building types (e.g., utility and unoccupied buildings) which are not required to be LEED™ Silver certified. Utilize LEED™ Silver rating criteria as a goal for these projects.

Recommendation #5: Require project teams for <u>all</u> projects, including projects not required to be LEED™ Silver certified, to report to the Maryland Green Buildings Council on their effort to include green building principles in these projects.

Energy

Recommendation #1: The Energy Committee suggests that the Council find funding for an analysis of the benefits and costs associated with a 6% procurement of green power for Maryland.

Recommendation #2: The Energy Committee suggests evaluation of the success of the procurement process as it relates to green power and making recommendations for modifying the goal for the next procurement.

Recommendation #3: The Energy Committee recommends that efficiency gaps be identified to determine the energy efficiency potential for State facilities.

Recommendation #4: The Energy Committee suggests leaving the goal at the current level and evaluating the progress once the Green Buildings Council's High Efficiency Green Buildings recommendations are in place to see what the actual reductions in energy usage are over "business as usual," and to consider a requirement that energy usage be reduced overall.

Recommendation #5: Minimum renewable energy requirements should be established for each State agency in conjunction with MEA.

Recommendation #6: Through credit for distributed generation, renewable energy should be integrated into State buildings with the Clean Energy Procurement Goals.

Alternative Fuel Vehicles (AFV)

Goal: Revise fleet policy and purchasing guidelines to offer more flexibility in purchasing low emission and alternative fuel vehicles for the State's fleet:

Recommendation #1: Expand awareness of AFV options to Agency managers and require them to procure AFV's where practical.

Recommendation #2: Provide financial support for funding the incremental cost of CNG (Compressed Natural Gas) and other higher cost AFV's.

Recommendation #3: Whenever possible, assign AFV's to staff that have state vehicles assigned to them.

Recommendation #4: Whenever possible and practical, substitute a Ford Taurus flex-fuel vehicle for a Sports Utility Vehicle (SUV). Since the maximum emissions reduction benefit is derived from vehicles designed to operate on an alternative fuel exclusively, emphasis should be placed on purchasing dedicated fuel vehicles.

Recommendation #5: Develop and implement a Fleet Manager's "Buyers Education Program" that provides Department/Agency fleet managers with the educational information they need to acquire and use AFV's effectively. This can be accomplished via a series of informational memos and a short series of workshops.

Recommendation #6: Whenever possible and practical, incorporate the use of biodiesel B20 in the State's fleet of diesel engine vehicles and equipment, and encourage its use by contractors that do construction and maintenance work for the State.

Goal: Ensure that for fleet units operating bi-fuel or flex-fuel vehicles, an average of 50% of the fuel used by those vehicles is alternative fuel:

Recommendation #1: Require that managerial staff committments at all Agency levels be made to ensure that this goal can be met.

Recommendation #2: Incorporate performance objectives and the means to monitor and measure performance achievement into the Agency performance and personnel performance review processes.

Recommendation #3: Review and adopt, where practical, technologies and incentives that prompt drivers to fuel with the alternative fuel rather than the conventional fuel, at refueling facilities.

Recommendation #4: Maximize the environmental benefits of alternative fuels by focusing on AFV and alternative fuel use in the urban, air quality non-attainment areas of metropolitan Baltimore and Washington, DC.

Recommendation #5: Explore the opportunity to collect fuel use information at the refueling dispenser and link that use data to the State's fuel use tracking system.

Recommendation #6: Develop and implement an Employee Training Program on the benefits, use, and fueling of AFVs, fueling facility locations, etc. Couple this training program with the current driver safety training and new employee orientation programs.

Goal: Help develop the refueling and maintenance infrastructure required to make certain types of AFVs practical:

Recommendation #1: Provide the financial commitment to acquire the fueling facilities and purchase the fuels needed to achieve this goal provision. Review and pursue Federal and State agency incentives that may be available to support goal achievement, while minimizing the cost to the State.

Recommendation #2: Construct E85 fueling facilities in Annapolis and the Baltimore State office building complex to permit fueling of the maximum number of E85 flex-fuel vehicles.

Recommendation #3: Evaluate current CNG fueling locations and the need for providing additional CNG fueling facilities to maximize the fueling of CNG vehicles within the State fleet.

Recommendation #4: Identify opportunities for leveraging the availability of existing private sector fueling facilities to potentially serve State fleet vehicles, and if practical, leveraging the use of current State fueling facilities to a broader segment of non-State alternative fuel users.

Goal: Provide technical assistance and other incentives to use clean energy, where practical, in State transit fleets:

Recommendation #1: Perform an assessment of the transit bus operations in the State, with emphasis given to those transit operations in the urban areas of metropolitan Baltimore and Washington DC, to determine which of the clean vehicle/fuel technologies provides the best balance of air quality benefits, cost, and operational suitability.

Recommendation #2: Based on the results of Recommendation No.1 above, develop an implementation and incentive plan for a long-term program for converting the State's transit fleet to clean vehicles and fuel technologies.

Recommendation #3: Make the financial commitment for implementing the plan, and carry out the plan.

Recommendation #4: Perform a similar analysis and develop an implementation plan for the school bus fleets that operate within the State.

Pollution Prevention

Recommendation #1: Review and ensure that all State agency building leases include appropriate locations for recycling bins, contact personnel, material staging, and address logistical issues related to collection of source separated recyclables.

Recommendation #2: Contracts for janitorial services and trash/recycling material collections in all government buildings shall demonstrate accountability through "performance contracting," rating a contractor's compliance with the recycling provisions of their contract and consistently using that rating as a determining factor for future bidding.

Recommendation #3: Encourage the use and expand the availability of items made from recycled content offered on State procurement contracts. The DGS website (www.dgs.state.md.us) includes a database of recycled materials offered under State contract.

Recommendation #4: Ensure opportunities for the recycling of computers and other electronics from State agencies.

Recommendation #5: Increase opportunities for State agencies to procure environmentally preferable products including carpet, paint, toner cartridges, and ceiling tiles manufactured with recycled content and energy saving equipment.

Recommendation #6: Fully implement the price preference provisions for the purchase of recycled products by State agencies pursuant to Maryland regulations.

Recommendation #7: Designate a recycling coordinator for each State agency and satellite office to direct and oversee the agency/satellite office's recycling program. This responsibility should be incorporated in the employee's job description and be an element in the job performance evaluation to ensure accountability. Each unit within an agency shall appoint an employee to participate on an agency recycling committee.

Recommendation #8: Provide recognition to agencies for waste diversion activities such as buying recycled materials, reducing the use of virgin materials, and promoting recycling through specific education and outreach initiatives.

Recommendation #9: Explore implementation options to create a 30% waste diversion goal to include measurable credit up to 10% for source reduction activities in State agency offices in addition to the 20% recycling goal.

Introduction

Maryland has recognized that we must change the way in which growth and development occur in the State in order to provide for sustainable/environment-friendly development for future generations. Too often, sprawling low density, single-family housing, and commercial development have dominated local growth patterns. In the 1997 Session, Governor Parris N. Glendening and the Maryland General Assembly strengthened Maryland's response to the continuing and damaging effects of such suburban sprawl by enacting the *Neighborhood Conservation and Smart Growth* (Smart Growth) initiative. The intent of this legislation was to direct growth back into the state's older cities, towns, and communities where the infrastructure already exists. These initiatives expanded upon the State's ongoing activities created by the Economic Growth, Resource Protection, and Planning Act of 1992, which provided Maryland's first major statewide growth management legislation. Smart Growth has focused the State's fiscal resources to support intelligent growth in Maryland's established communities and to withhold State support that would encourage development in agricultural and other natural resource areas. During the 2001 General Assembly, Smart Growth was expanded with the passage of the GreenPrint and Community Legacy programs, culminating with the creation of a Smart Growth cabinet position and the Office of Smart Growth.

Smart Growth is but another example of Maryland's leadership in a long history of environmental stewardship. Starting in 1982, Maryland joined Pennsylvania, Virginia, the District of Columbia, and the Federal government in a major effort to protect and restore the Chesapeake Bay. In 1992, these partners in the Bay Program ("Signatories") recognized that achieving the desired reduction in nutrients in the Bay would require tributary-specific plans. Maryland's approach was to develop strategies for its ten watersheds. Local governments, interest groups, and citizens in each watershed were organized into "Tributary Teams" to help implement these individual nutrient reduction strategies. In an effort to meet Maryland's nutrient reduction commitment to the Chesapeake Bay Agreement 2000 Program, the Lower Western Shore Tributary Team addressed the levels of nitrogen loading from air pollution. As much as 27% of the total nitrogen loading into the Bay comes from atmospheric deposition, most of which is generated from coal burning power plants and transportation. The long term success in reducing levels of atmospheric nitrogen will depend upon switching to cleaner sources of power generation, reducing the demand for power, and switching to alternatively-fueled vehicles.

In May of 2000, during the annual meeting between the Tributary Team Chairs and Governor Glendening, the Governor addressed the need for reducing nutrient loads from atmospheric sources into the Chesapeake Bay and Maryland Government's commitment to leading by example. The Governor directed the Departments of General Services, Natural Resources, Environment, and the Maryland Energy Administration to draft an Executive Order that addressed the need to purchase power from green generation sources as well as the construction of State facilities that would consume less energy. On May 13, 2001, Governor Glendening signed **Executive Order 01.01.2001.02 -** *Sustaining Maryland's Future with Clean Power, Green Buildings and Energy Efficiency.*

The Order contains three sections. Section A addresses the issue of producing energy with cleaner power sources. It establishes a goal requiring that part of the electricity purchased for use within state facilities comes from Green Power sources. Section B creates the Maryland Green Buildings Council (the "Council"). The Council is charged with establishing a High Efficiency Green Buildings Program (the "Program") and providing recommendations on standards and criteria for use by the Program. Lastly, Section C establishes several additional goals related to greater

energy efficiency within State facilities. They include the purchase of products in the top 25% in energy efficiency and pollution prevention, and increased flexibility in the purchase of low emission and alternative fuel vehicles.

The focal point of the Executive Order is the Maryland Green Buildings Council and its responsibilities. The Order stipulated that the Council include members representing environmental, business, and citizen interests, as well as those State agencies with large facility portfolios and related responsibilities, to ensure that a diversity of opinions and concerns were represented. The Council is intended to serve as an on-going forum for recommending and monitoring state actions related to energy efficiency, energy production and sustainability issues and policies. The Council's recommendations will not only save Maryland taxpayers millions of dollars by spending less to heat, cool and illuminate State facilities, it will also help Maryland grow smarter and contribute to meeting Maryland's commitment to protecting the environment, restoring the Chesapeake Bay, and improving air quality.

The Council directed its attention to meeting the time-frame for recommending standards and criteria for Green Building to operationalize Green Building concepts for State facilities. The USGBC's LEED™ program was adapted so as to implement a program without burdening the state with inordinate costs and a larger bureaucracy, yet allowing flexibility of design. No statutory changes were required. Lastly, the Council recognized the State's leadership in serving as a catalyst for the commercial and residential sectors to follow.

Beyond developing the Program and associated criteria, the Council is also charged with the following responsibilities:

(i) Annually re-evaluating the Clean Energy Procurement Goal,
(ii) Considering additional State energy efficiency, production and sustainability issues and policies,
(iii) Developing a comprehensive set of initiatives known as the "Maryland Greenhouse Gas Reduction Action Plan",
(iv) Reviewing State agencies progress in achieving the new water conservation goals,
(v) Reporting annually to the Governor and General Assembly on the efforts of State agencies to implement the High Efficiency Green Buildings Program goals, Clean Energy Procurement Goal, the Greenhouse Gas Reduction Plan, and other energy efficiency, production, and sustainability issues and policies the Council may consider.

This document represents the Council's report to the Governor for 2001 outlining progress made toward meeting its stated responsibilities. The accompanying document entitled ***"Maryland's High Performance Green Building Program"*** (Appendix B) represents the completion of the Council's initial task to establish a High Efficiency Green Buildings Program and provides recommendations on standards and criteria for use by the Program.

Background

Conventional land development and building practices consume precious natural resources, generate excessive amounts of waste, disrupt hydrologic regimes, degrade air quality and natural ecosystem function, eliminate habitat, and disrupt native biodiversity. In contrast, Green Building provides for design and construction in a manner which encourages efficient use of raw materials and natural resources, protects the environment, and promotes sustainable communities. Green Building is not a particular style, technique, or practice. Rather, it is a philosophy of land development fostering environmental responsiveness, resource efficiency, and community and cultural sensitivity.[1]

The momentum for Green Building design can be traced to the oil crisis of the 1970's and the need for increased energy efficiency. During that same time, recycling in the United States was becoming increasingly more commonplace. In the 1980s, the emergence of the "sick building syndrome" increased concern for worker health and productivity. Toxic material emissions were also examined. Projects in water-scarce areas began developing ways to conserve that resource. In the beginning, many early green designs focused on one issue at a time, mainly energy efficiency or use of recycled materials. But during the 1980s and 1990s, green designers began to realize the integration of all these factors would produce the best green results, a "high-performance" building.[2]

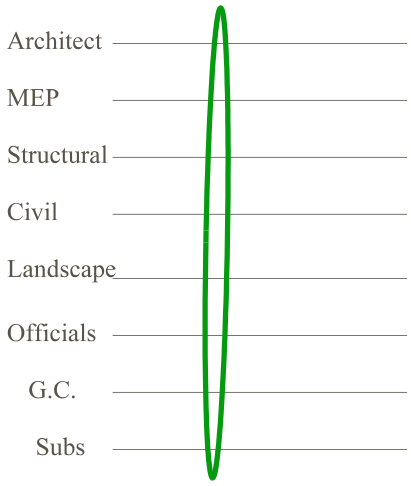


Figure 1 Integrated Design Process

The typical design process is a "stovepipe" process with each discipline working independently and sequentially. As shown in Figure 1, green development provides a framework for crossing between disciplines and integrating the process. The International Netherlands Group (ING) Bank in Amsterdam is often touted as the example of how green development is achieved.[3] Largely daylit, highly energy efficient, architecturally innovative with such features as curvilinear form, using local materials and plants, with flowing water incorporated into the building, the project began first as a comprehensive vision of the features and qualities that the ideal building would incorporate. Following the creation of the vision, a process was designed to integrate planning and design in which performance goals were identified up-front. This integrated process consists of four overlapping components: whole-systems thinking, front-loaded design, end-use/least cost considerations, and teamwork. Thus, a

1 Rocky Mountain Institute, Green Development: Integrating Ecology and Real Estate (John Wiley & Sons, Inc. New York, NY. 1998), 3-24

2 Keppler, S. and J. Tibbs, "LEED™: Good for Business, Good for the Environment." The Construction Specifier, (The Construction Specifications Institute. Alexandria, Virginia, 2000.

3 Rocky Mountain Institute, 25-65.

key difference in a Green Building is not a new concept to Maryland. When the Smart Growth initiative was introduced in 1997, it focused on bringing growth and development back into growth areas known as Priority Funding Areas, the existing communities, towns, and cities where the supporting infrastructure already exists. This is one facet of growing smarter. It was recognized that to protect the State's waters and living natural resources, *how* you build is just as important as *where* you build.

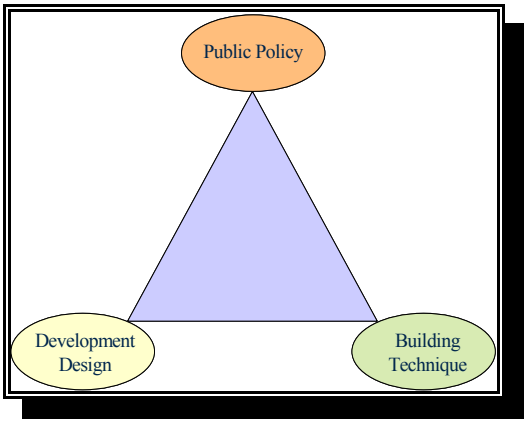


Figure 2 Sustainable Development

Current Efforts

The State of Maryland has been a leader in environmental resource protection for many years, including sustainable design elements in many of its projects and practices. The following are just a few examples of the use of "Green Building" principles already at work throughout the State:

- Smart Growth initiatives have been developed as well as the newly created Office of Smart Growth. These principles have been emulated nationwide.

- The Department of General Services has collaborated with the Maryland Energy Administration (MEA) on Energy Performance Contracts, implemented green leasing criteria, purchased energy saving products and equipment for Sate agencies and is currently developing green building pilot projects for St. Mary's College and the Department of Natural Resources. The Department of General Services is also developing a program to provide commissioning services for new building projects.

- The Maryland Department of the Environment (MDE) has completed a new Stormwater Management manual emphasizing the use of environmentally sensitive development to enhance ground water recharge, water quality, and "greener" development. The MDE Maryland Recycling Act of 1988 has resulted in Marylanders recycling 36% of their solid waste in the year 2000. The Maryland Water Conservation Plan is a three pronged plan to achieve state-wide water conservation through State and community conservation efforts as well as education/outreach programs. MDE also permits the reuse of treated wastewater for irrigation and other uses. MDE's new "green" headquarters is Maryland's first "Green Lease" using LEED™ criteria and developed with DGS's Office of Real Estate. This collaboration has resulted in the redevelopment of the long abandoned Montgomery Ward warehouse building in Baltimore (over 1.3 million square feet) as "green" construction. MDE works closely with the Maryland Department of Transportation to insure that transportation and air quality goals are consistent and compatible. The Voluntary Cleanup/Brownfields Programs have created the opportunity to streamline the cleanup process for contaminated industrial and commercial sites, thereby facilitating their reuse and integration of green practices.

- The Maryland Energy Administration and DGS have worked together to reduce the energy usage of the State's existing buildings, reporting the results of their efforts since 1992.

- The Department of Natural Resources has implemented stringent afforestation programs as well as Green Building Outreach programs.
- The Department of Transportation has developed statewide mass transit programs and is currently developing a new, "green" headquarters building adjacent to the Baltimore/Washington International Airport.

- The Maryland Department of Housing and Community Development developed and is currently implementing the Maryland Building Rehabilitation Code. This unique code eases some standard building code requirements to make rehabilitation of existing buildings more economically feasible and helps projects meet minimum requirements of the LEED™ Green Building Rating System.

Additionally, the Public School Construction Program (PSCP) has a history of promoting Green Building principles through the encouragement of effective and efficient planning, design, construction, operation and maintenance of public schools. In June 2001, the PSCP recently organized and sponsored a one day geothermal workshop entitled "High Performance School Buildings: Green Buildings in Maryland " which drew 240 participants. The PSCP is currently working to develop methods to assist school systems and their design professionals to implement Green Building principles in all of their projects. The Public School Construction Program envisions that Green Building concepts and features will be incorporated into all public school buildings in the near future.

The Maryland Green Buildings Council provides a framework to integrate all of these efforts and change the way the State designs, constructs and operates its buildings.

In combination with resource-efficient and desirable construction, designs that incorporate community and economic development policies, along with revitalizing older neighborhoods, and new compact, mixed-use, walkable neighborhoods in designated growth areas, provide for increased quality of life and greater resource protection. As seen in Figure 1, these two aspects of ***how*** we build, along with the Smart Growth policy of ***where*** we build, form the foundation for sustainable land use management.

In the Spring of 2000, Governor Glendening participated in the signing of the new Chesapeake Bay Agreement. This Agreement, known as Chesapeake 2000, in addition to reaffirming Maryland's commitment to reducing nutrient input into the Bay, recognized that land use practices have a significant impact on the health of the Chesapeake Bay. It promotes development standards, that "...integrate environmental, community and economic goals by promoting more environmentally sensitive forms of development."[4] The Agreement recognizes that the successful restoration of the Bay will depend upon government leading by example to encourage the active participation of business and citizens. The following are several commitments associated with this:

g By 2002, each Signatory will put in place processes to

  - Ensure that all properties owned, managed, or leased by the Signatories (or design and construction by the Signatories) are developed, redeveloped, and used in a

4 Chesapeake 2000

manner consistent with all relevant goals, commitments and guidance of this Agreement.

- Expand the use of clean vehicle technologies and fuels on the basis of emission reductions, so that a significantly greater percentage of each Signatory's fleet of government vehicles use some form of clean technology.

The *Sustaining Maryland's Future with Clean Power, Green Buildings and Energy Efficiency* Executive Order institutionalizes Maryland's commitment to government leading by example and pulls together and establishes a number of efforts related to environmental sustainability.

This Executive Order along with Smart Growth policies to combat the adverse impacts of sprawl, and several other initiatives, both executive and legislative, form a comprehensive strategy to protect the State's natural resources and to set the example for citizens and businesses to be good stewards. Other initiatives include two Executive Orders, a House Joint Resolution, and a House Bill. Following is a short description of each initiative (the full text of each is contained in Appendix A.)

Executive Order 01.01.2001.06, ***Water Conservation by State Agencies***, signed by Governor Glendening in May 2001, is intended to reduce water consumption through conservation. State agencies have been directed to reduce water consumption by at least 7% by 2003, 8% by 2005, 9% by 2007, and 10% by 2010 (relative to baseline water use in 2000) in facilities which they own, lease, or manage. They must also conduct an annual water use audit in each of their buildings to measure and account for the amount of water used, to detect inefficient water fixtures for replacement, and to identify any water conservation measures for immediate implementation.

- Executive Order 01.01.2001.07, ***Task Force on Energy Conservation and Efficiency***, signed in June 2001, establishes a task force to 1) evaluate historic, current, and projected energy use to determine an energy reduction goal for the state; 2) recommend strategies to attain the energy reduction goal; 3) investigate barriers to investments in energy efficiency measures; 4) determine the most effective elements of an energy conservation program, and 5) document anticipated energy savings resulting from proposed conservation measures.

- House Joint Resolution 14 of 2001 establishes a task force to study lighting efficiency and light pollution in Maryland. The purpose of the task force is to study the costs, extent, and consequences of inefficient public lighting and light pollution in the State and benefits of alternative improvements.

- House Bill 8 of 2001, the ***"Income Tax Credit for Green Buildings,"*** provides credits against the State income tax for construction or rehabilitation of buildings to meet certain energy efficiency and environmental standards.

- In the 2000 legislative session, the General Assembly passed House Bill 20, the ***"Maryland Clean Energy Incentive Act,"*** which provides an exemption from sales and use tax for certain energy-efficient appliances; a credit against the motor vehicle excise tax for electric vehicles and vehicles with an onboard, rechargeable energy storage system; and an income tax credit for solar energy systems.

The following Council subcommittee reports outline the goals and recommendations the community, business, and state government offer to improve Maryland's air quality, conserve energy, reduce pollution, and recycle its solid waste.

High Efficiency Green Buildings Subcommittee

Executive Order Requirements

(1) The State shall develop a High Efficiency Green Buildings Program committed to utilizing energy efficiently and environmentally responsible approaches in the design, construction, operations, maintenance, and deconstruction of all new and, to the extent possible, existing State owned and leased facilities.

(2) The Council is charged with creating the High Efficiency Green Buildings Program. Within 180 days of its inception, the Council shall make recommendations to the Governor regarding appropriate criteria, standards, and a numeric rating system (modeled after the United States Green Building Council's Leadership in Energy and Environmental Design (LEED™) Green Building Rating System and the federal ENERGY STAR Program) for use by the Program.

Efficient Product Purchase Goal: *The State shall purchase ENERGY STAR products when purchasing energy using products including computers, printers, copiers, and other equipment, or shall purchase products in the top 25% in energy efficiency for products where labels are not available.*

Summary of Issues

Currently designed and constructed buildings have not generally calculated environmental impacts beyond their "foot print." Tremendous amounts of resources are consumed by buildings and their occupants which then often become waste products. Air and water are fouled as the by-products of energy production needed to heat, cool and power our buildings. The manufacture and transport of building materials and equipment adds to waste and pollution. Open landscape and natural habitats disappear as buildings, parking lots, and roads continue to sprawl out of control. Unhealthy indoor environments reduce productivity, and in some cases, cause sickness. Maryland and other jurisdictions have recognized that protecting a higher quality of life points us in another direction.

The Green Building design movement has gained momentum over the past ten years, but still has a way to go before it is embraced by the industry as simply good design. By implementing Green Building principles in its own buildings, the State has the opportunity to demonstrate these principles while at the same time reaping the resulting economic, environmental, and social benefits. Leading by example, the State will provide opportunities for design, construction, and development firms to gain experience in Green Building, thus stimulating the use of these methods in the private sector and helping to foster the market for related products and practices.

Discussion

The High Efficiency Green Buildings subcommittee focused on making the new Green Buildings Program easy to implement and administer in a short time frame. The U.S. Green Building Council's LEED™ Green Building Rating System, cited in the Executive Order, provides an existing administrative framework. The system was carefully developed over a seven year period and is a voluntary, market-driven rating system which evaluates performance from a whole-building perspective. It is national in scope and allows for comparisons with other jurisdictions and private development. In addition, the system is flexible and non-prescriptive, encouraging the design team to use the best strategies for each project. Finally, the system will continue to be revised by the USGBC to keep up with the latest developments in Green Buildings.

As a member of the USGBC, the State will have the opportunity to be involved in the continued development of the LEED system program. Rather than create a separate Maryland rating system based on LEED™, the subcommittee recommends the use of the current version of the LEED™ Green Building Rating System and the USGBC's infrastructure to certify the State's projects. The system requirements will be automatically updated with each update released by the USGBC. The committee also recommends that several of the LEED™ criteria, as outlined in the Program, be mandatory for all projects which are required to be LEED™ certified.

The Committee also studied the U.S. Environmental Protection Agency's (EPA) ENERGY STAR rating system. This system is used primarily to track building energy performance after the first year of operation. At this time, the ENERGY STAR performance benchmark database is limited in scope and may not be easily applied to many State building types. The U.S. Green Building Council is working with EPA to integrate ENERGY STAR into the LEED™ system. It is expected that this integration will take place in time for the release of LEED Version 3.0 in March of 2003. The committee will continue to work with EPA and the USGBC to incorporate the ENERGY STAR system into the Green Building Program.

Criteria

The LEED™ system has four levels of certification: Certified, Silver, Gold, and Platinum. Projects achieve a rating by accumulating points for utilizing various recommended green strategies in the design and construction of the building and its site selection and treatment. The committee reviewed other jurisdictions which already use the LEED™ system and found that the LEED™ Certified level is the most commonly used benchmark. Several of the other jurisdictions used the LEED™ Silver level. Requiring the Gold and Platinum levels of LEED™ certification may not be practical for all State projects at this time. However, agencies will be encouraged to strive for the Gold rating whenever possible. The committee recommends that the Silver level of certification be required of State projects. This demonstrates the State's commitment to Green Building, providing a "leading edge" attainable goal.

In determining the minimum size project required to comply with the program, the committee again looked at other jurisdictions and reviewed typical State projects. Many other jurisdictions chose a minimum size of 5,000 or 10,000 square feet as the benchmark for compliance. With some concern that the smaller sized projects may be more difficult to certify for a reasonable cost, the committee reviewed the nature of existing State projects in this size range. Based on this review, the committee recommends a base of 7,500 *gross* square feet for new construction and renovations, and 5,000 *net* programmed square feet for leased projects. (The State leases space based on net usable square footage.) The committee further recommends that projects below these minimum thresholds use the Silver rating as a goal, but would not have to be certified. Additionally, it is recommended that some utility building (largely unoccupied types) not be required to be certified. However, their design teams would be encouraged to employ Green Building principles in their design and construction. The Green Buildings Program will require all project teams to report their Green Building efforts to the Maryland Green Buildings Council.

Costs

Some advocates of Green Buildings suggest that if building green is a project priority, decisions based on that priority will minimize or eliminate any additional costs. In the case of State buildings however, the main priority of any project is to implement the Using Agency's mission. Green Building will remain complementary to this mission. Because the design process is a more intensive, collaborative process, initially it is expected that the up-front costs of design and construction to build green will increase slightly. Construction costs will increase as contractors locate sources of green materials, recycle construction waste, and implement other green

strategies they are not now using. At the present time, reliable design and construction costs for building green are not available. Anecdotal costs for achieving a Silver LEED™ rating vary from an additional 3% to 10% for construction, and an additional 3% to 5% (of construction costs) for design and building commissioning services. The Department of General Services has commissioned a survey of Green Building owners to create a database of costs to be used in the State's capital project program and budget development. The survey is scheduled to be completed in the Fall of 2001. It is important to remember that one of the primary goals of Building Green is to reduce the life cycle cost of a building through significant energy savings as well as through increased productivity of the building's users.

Efficient Products Purchase

The committee is currently reviewing this issue and will develop recommendations in the future.

Recommendations

In order to implement the Green Building Program at this time, no programmatic, legislative, or regulatory changes are necessary. As the Program and its use continues, the subcommittee will review completed projects as well as feedback from design firms, project managers, using agencies, and contractors and make recommendations for changes which may enhance the implementation of the program.

To summarize, the committee has made the following recommendations for the State's High Efficiency Green Buildings Program:

Recommendation #1: Beginning November 1, 2001, all State owned and leased capital projects funded for design in FY 2002 that have not initiated the Request for Proposal (RFP) for an architect and engineering (A/E) contract shall comply with the High Efficiency Green Buildings Program. Development teams for FY 2003 projects that have already selected the A/E contract and projects funded prior to FY 2003 and are currently in design shall review projects and shall identify Green Building features that can, where practical, be included.

Recommendation #2: Maryland will adopt the Silver Rating of the current version of the U.S. Green Building Council's LEED™ Green Building Rating System as the minimum standard for all new facilities eligible under this Program which are owned or leased by State agencies. This rating forms the basis for the criteria outlined in the accompanying ***"Maryland High Performance Green Building Program."*** Projects are encouraged to strive for the Gold rating wherever possible.

Recommendation #3: The minimum eligible project size is 7,500 occupied gross square feet for new construction and renovations and 5,000 occupied net square feet for leased projects. Certain utility type or unoccupied building types will not be required to be LEED™ Silver certified.

Recommendation #4: Encourage the use of Green Building principles for projects which are smaller than the minimum size requirements and for building types (e.g., utility and unoccupied buildings) which are not required to be Leed™ Silver certified. Utilize LEED™ Silver rating criteria as a goal for these projects.

Recommendation #5: Require project design teams for <u>all</u> projects, including projects not required to be Leed™ Silver certified, to report to the Maryland Green Buildings Council on their effort to include Green Building principles in these projects.

Future Efforts

This committee's efforts do not end with this report. It will continue to work to strengthen the State's Green Building efforts. Some of the issues to be considered in the future include the following:

A. Re-evaluate eligibility requirements on a regular basis.
B. Evaluate success of the Green Building program based on project reports, especially for projects which are not required to be Leed™ Silver certified.
C. Develop incentives for projects to exceed the minimum Silver rating.
D. Develop education opportunities for all participants including using agencies, design consultants and contractors.
E. Consider development of re-certification requirements.
F. Develop a program to upgrade existing State buildings utilizing the upcoming Leed™ for Existing Buildings- the Leed™ Green Building Rating System for Improving Building Performance through Upgrades and Operations.
G. Continue to monitor efforts and results of other public jurisdictions' Green Building Efforts.
F. Develop incentives for local governments, especially state-assisted construction projects to incorporate Green Building Design.
G. Promote use of green building design in private construction and lease projects, including residential structures.
H. Evaluate how state agencies can best coordinate and administer the Green Buildings Program and determine staff resources necessary to accomplish this goal.
I. Make recommendations concerning efficient products purchase
J. Develop a database to track Green Building costs vs. savings.

Energy Subcommittee

Executive Order Requirements

(1) Clean Energy Procurement Goal

A. *For purposes of the Executive Order, "Green Energy" is defined as energy generated from wind, solar photovoltaic, solar thermal, biomass, landfill gas, and the combustion of municipal solid waste.*

B. *For the procurement of electricity for use within State owned facilities, the State of Maryland has a goal of 6% be generated from Green Energy. No more than 50% of the total Green Energy procurement shall be derived from the combustion of municipal solid waste.*

C. *In the selection of a power generation contractor chosen through the procurement process, priority consideration should be given to companies that produce green power in Maryland. The chosen contractor shall obtain certification from a State approved accreditation process which states the company has met the Green Energy goal.*

D. *The Council shall annually re-evaluate the Clean Energy Procurement Goal.*

Additional Energy Efficiency Goals

(2) Energy Efficiency Improvement Goal: *The State, through cost-effective energy measures, shall reduce energy consumption per gross square foot of its facilities by 10% by 2005 and 15% by 2010, relative to a 2000 baseline.*

(3) Renewable Energy Project Goal: *The State shall expand the use of renewable energy within its facilities, including supporting the federal Million Solar Roofs program.*

(4) Maryland Greenhouse Gas Reduction Action Plan *The Council shall develop a comprehensive set of initiatives known as the "Maryland Greenhouse Gas Reduction Action Plan."*

Summary of Issues

Green Power Procurement Goal

In the development of the Executive Order, the existing Electricity Deregulation Advisory Committee (EDAC) Green Power Subcommittee recommended the Executive Order require a goal of 6% for the procurement of electricity for use within State owned facilities. The State's purchase of green power can help develop the market for cleaner, renewable energy sources by fostering the development of renewable resources in and around Maryland to meet our need. Relying on renewable resources for a portion of our electricity can also improve air quality and reduce the impact on the environment. This goal of 6% was carried forward to the Executive Order. The Electricity Request for Proposal (RFP) was released in September 2001

Energy Efficiency Improvement Goal

The Energy Efficiency Improvement Goal sets energy efficiency targets for State Government, requiring increased efficiency in energy use and conservation of energy where possible. In establishing such a goal, the energy use in State buildings, given a 2000 baseline will be examined.

In an effort to lead by example, Maryland State Government has been setting, and meeting, energy efficiency and reduction targets since 1992, the State has reduced energy use per square foot by 25 percent. The current goal of 10% reduction by 2005 and 15% by 2010 is an extension of that goal.

Renewable Energy Project Goal

Distributed, or on-site, renewable generation is becoming a more cost effective means of generating electricity. Most State facilities have a long life, making renewables projects such as building integrated solar curtains, solar roof panels, or wind turbines more economically feasible. In addition to driving down the cost of renewable generation by enhancing the market, the State will also be leading by example. Solar panels, which provide generation during peak load periods such as hot summer days, can reduce the need to build new peaking power plants, and can reduce emissions associated with the generation of power. Wind power can also be an effective source of energy for State facilities, especially on the Eastern Shore and in western Maryland.

Maryland Climate Change Action Plan (Greenhouse Gas Reduction Action Plan)

Maryland has a history of environmentally progressive policies and programs. However, the State has not yet developed a formal strategy on climate change, the premier environmental challenge of the 21st century. The signing of the Executive Order, "Sustaining Maryland's Future with Clean Power, Green Buildings and Energy Efficiency," in March 2001 initiates a formal process to evaluate and address the threats of increasing greenhouse gas emissions. In this Executive Order the Governor calls for the development of a comprehensive set of initiatives known as the "Maryland Greenhouse Gas Reduction Action Plan."

A Greenhouse Gas Emissions Reduction Plan (hereafter referred to as the Climate Change Action Plan) will describe how we can reduce Maryland's greenhouse gas (GHG) emissions, and the potential impacts of those reductions. These plans help states to identify, and consequently to implement, feasible and effective policies to reduce GHG emissions at the state level. Through the development process, the Green Buildings Council members will assist in identifying strategies that are tailored to the specific circumstances and needs of Maryland.

Current Efforts

Green Power Procurement Goal

The Energy Deregulation Advisory Committee (EDAC), the Committee working on designing the electricity procurement for State facilities, is currently re-evaluating how to meet the Governor's green power goal of 6% in light of the previously unsuccessful procurement. This process is already in underway, with EDAC evaluating procurement strategies. Additionally, a Request for Information (RFI) was issued to gather information from the green power providers themselves on how best to structure a procurement, and the RFP is out with a bidders' meeting scheduled for October and award scheduled for November.

Energy Efficiency Improvement Goal

The General Assembly set up a previous goal of a 25% reduction in energy usage in State buildings by 2001 based on a 1992 baseline. MEA/DGS has met this goal. The new goal put forward in the Executive Order references a 2000 baseline. MEA and DGS are currently working

on a 2000 baseline from which to evaluate progress. The data requirements are sizeable. The DGS Energy Manager will assume leadership in the collection of this data with MEA continuing to report to the Legislature on progress towards the goal. Electronic transfer of this data will facilitate the process.

Renewable Energy Project Goal

Maryland was the first partner in the federal Million Solar Roofs (MSR) Initiative. This initiative sets a goal of one million installations by 2010. MEA is actively involved in this program, recently approving grants to 60 homeowners in Maryland to help with the installation of solar panels on their roofs. MEA has also received a grant for outreach and education associated with the Maryland Solar Schools Program. Unfortunately, the MSR Initiative does not provide funding for the actual solar panels hardware. MEA is also partnering with DOE's Wind Powering America Program to create a detailed and updated wind map of Maryland and to promote wind development in the State. MEA is working with the Department of Budget and Management and DGS to encourage renewable generation on/with State facilities and to overcome barriers to using solar, wind and biomass, and other renewables applications as a cost-effective source of electricity for State buildings.

Maryland Climate Change Action Plan

MEA has applied for a grant from the EPA to do a climate change action plan. MEA is taking the lead in this effort for climate change **policy**, with active participation by MDOT, MDE, and DNR, and will bring other agencies on board throughout the process, with an award notification expected in September. The following states have, or are in the process of, developing climate change action plans: Washington, Oregon, California, Colorado, Utah, New Mexico, Alabama, Tennessee, North Carolina, Kentucky, Missouri, Illinois, Iowa, Delaware, Pennsylvania, Wisconsin, Minnesota, New Jersey, New York, Maine, Rhode Island, New Hampshire, Vermont, Hawaii, and Puerto Rico. It should be noted that New Jersey is the only state that currently has set a numeric GHG emissions reduction goal. MEA is also funding an impacts assessment and is working with MDE on a compendium of current State programs that support GHG reductions.

Discussion

Green Power Procurement Goal

The subcommittee discussed offering guidance, through the Green Buildings Council, on the State's willingness-to-pay for green power. If the State does get bids for green power in this next procurement, there is a very good chance there will be a premium associated with the power purchase. Given the Governor's goals in procuring green power (including fostering the development of renewable resources in and around Maryland, improving the air quality and reducing the State's impact on the environment), what benefits are attributable to the purchase of green power and how much of a premium should the State pay? Are there other mechanisms available to foster the development of renewable resources in the State if the 6% goal cannot be realistically achieved? The Energy Committee suggests that the Council find funding for MEA to do an analysis of the benefits and costs associated with a 6% procurement of green power for Maryland. An additional concern that needs to be addressed is how do we incorporate (or do we) the use of renewable distributed (on-site) generation (DG) and combined heat and power into the green power goal? The development of a framework to incorporate DG could be a useful tool. Finally, the subcommittee's input may be most useful evaluating the success of the process and making recommendations for modifying the goal for the next procurement.

Energy Efficiency Improvement Goal
The Energy Committee recommends that efficiency gaps be identified to determine the energy efficiency potential for State facilities. Once this information is provided it will be possible to set more detailed energy efficiency improvement goals to make State Government operations as energy efficient as possible. The Energy Committee suggests leaving the goal at the current level, and evaluating the progress once the Green Buildings Council's High Efficiency Green Buildings recommendations are in place, to see what the actual reductions in energy usage are over business as usual, and to consider a requirement that energy usage be reduced overall. In analyzing the timetable with which any numerical goal can be achieved, innovative financing mechanisms that can expedite the process such as Energy Performance Contracting should be considered. This is especially important given the delays inherent in the State's General Obligation bond funding constraints.

Renewable Energy Project Goal
Due to the high up-front costs, on-site renewable energy is often cost-prohibitive in traditional benefits-costs analysis. However, State facilities are ideal locations for the installation and use of renewable energy technologies due to their long ownership structures. Essentially, State buildings are built for use in perpetuity. Minimum renewable energy requirements should be established for each State agency in conjunction with the MEA.. A renewable pilot project for each State agency should be identified. The life cycle costs and the site of each project should be evaluated, and financed, accordingly. Through credit for distributed generation, renewable energy should be integrated into State buildings with the Clean Energy Procurement Goals. We will continue to work with a representative of the Department of Budget and Management so we can better understand the financing process and determine ways to encourage renewable energy in the course of the planning and budget process.

Maryland Climate Change Action Plan
The EPA gave award notification to Maryland. MEA, MDE, and MDOT provided input and review of the successful proposal. MEA has begun to develop an RFP, based on the proposal sent to EPA. A cabinet level advisory group will be established this fall.

Description of Benchmarks

Green Power Procurement Goal
For the procurement of electricity for use within State owned facilities, the State of Maryland has set a goal that 6% be generated from "Green Energy." The benchmark of 6% includes wind, solar photovoltaic, solar thermal, biomass, landfill gas, and the combustion of municipal solid waste. Milestones in reaching and evaluating this goal include a cost/benefit analysis of the 6% goal, including quantifying externalities (providing a range of costs); a framework for inclusion of distributed generation and combined heat and power in the 6% goal; an evaluation of the success of the procurement process as it relates to green power; and making recommendations for modifying the goal for the next procurement.

Energy Efficiency Improvement Goal
1. Establish a sound baseline for energy use in State facilities by total energy use by fuel type
    - A. Total energy use by agency and building when possible
    - B. Total energy use by square foot
    - C. List of energy end-uses and estimates of demand by end-use
    - D. Baseline of "Telework"and "Hoteling" practices

E. Promote innovative financing such as Energy Performance Contracting to expand the State's financial capacity and to expedite implementation of energy efficiency improvements.

2. Identify benchmarks for energy use in commercial buildings (resources include Building Owners and Managers Association, Electric Power Research Institute, the EPA's Energy Star Program and Energy Service Companies).
3. Create a business as usual scenario for energy use in State government operations extending to 2020 based on projected growth in State government by employees, activity, and historical growth trends.
4. Conduct an "efficiency gap analysis" to identify the potential energy efficiency savings in State facilities.
5. Identify a moderate and aggressive energy efficiency improvement goal.
6. Make recommendations on how to achieve both the moderate and aggressive energy efficiency goals.

Renewable Energy Project Goal

1. Complete a strategy to increase the number of clean energy (e.g., solar, biomass, fuel cell or wind) projects in State facilities.
2. Establish minimum renewable energy requirements for State facilities.
3. Establish a credit system for State agencies using renewable distributed generation towards the State's Green Power Procurement Goal.

Maryland Climate Change Action Plan

1. Form an Interagency Working Group (the subcommittee members plus MDA, MDOT, Department of Planning, the Office of Smart Growth, and the Public Service Commission)
2. Secure EPA funding and issue a solicitation for outside expertise
3. Collect data on energy use statewide and GHG emissions inventory
4. Analyze policy options to reduce GHG emissions
   A. From energy use in state facilities and operations
   B. In the transportation sector
   C. In the industrial (including power) sector
   D. In the commercial sector
   E. In the residential sector
   F. Through waste reduction and recycling
   G. Through reforestation
5. Set goals and targets for Greenhouse Gas Reductions in Maryland. Goals will be set for both the State facilities and operations as well as statewide reduction goals to be achieved through voluntary initiatives, policies, and programs.
6. Complete a draft Greenhouse Gas Emissions Reduction Plan for review by the members of the Green Buildings Council.

Alternative Fuel Vehicles Subcommittee

Executive Order Requirements

Consistent with the goals of the Chesapeake 2000 Agreement, the State shall revise fleet policy and purchasing guidelines to offer more flexibility in purchasing, low emission and alternative fuel vehicles for its fleet. The State shall ensure that for fleet units operating bi-fuel or flex-fuel vehicles, an average of 50% of the fuel used by those vehicles is alternative fuel. The State shall help develop the refueling and maintenance infrastructure required to make certain types of AFV's practical and may provide technical assistance and other incentives to use clean energy, where practical, in State transit fleets.

Summary of Issues

The Subcommittee determined that accountability of Department/Agencies is needed to ensure meeting AFV goal requirements. One possible method for accomplishing this is to incorporate appropriate provisions into the State's "Managing for Results" program. There is a need for motivating State staff to use alternative fuels in vehicles capable of using those fuels. There is need to establish a better match between locations of AFV's in operation and existing fueling facilities. In future years, meeting the 50% alternative fuel use goal will expand fueling facility locations to provide more convenient access to vehicle operating locations throughout the State. The limited number of AFV repair facilities can cause AFV repair time to be longer than that for conventional vehicles, thus presenting difficulties in making vehicles available when needed. Certain AFV's (e.g., CNG vehicles) are more expensive than their conventional fuel counterparts. Even though the AFVs that use E85 and B20 are no more expensive than their conventional counterparts, E85 and B20 are more expensive fuels. Currently, there is essentially no E85 fuel available to serve the flex-fuel vehicles in the State fleet. Lack of knowledge and training limit the ability and willingness of State staff to take maximum advantage of available AFV's within the State fleet. The number of propane vehicle models available from auto manufactures is very limited; thus limiting the ability of the State to take advantage of propane as an alternative fuel. B20 fuel is becoming more available, thus improving the State's ability to take advantage of B20 as an alternative fuel. The subcommittee determined that achieving the four provisions of the Alternative Fuel Vehicle Goal will require a financial commitment to cover the additional cost of alternative fuels and AFV's initially until the availability of these vehicle fuels become more widespread and costs stabilize.

Current Efforts

Current efforts center on completing analyses of the following:

- Specific staff training needs related to alternative fuels, and the opportunity to "piggyback" these training needs with the vehicle safety training program given to State employees.
- Fueling facility locations (particularly for E85) to provide a better match with vehicle operating locations.
- Determining the amount of alternative fuel(s) that would need to be consumed to meet the 50% alternative fuels use goal in the State's current fleet of flex-fuel and bi-fuel vehicles, and the additional amounts that will result from hte need to meet future AFV purchases to satisfy Federal EPACT requirements.
- Estimate of the potential to use propane and B20 in State fleet vehicles at various locations throughout the State.
- Methods of increasing the staff motivation to use alternative fuels by incorporating appropriate goal provisions into Agency and individual performance measures and reviews.

Discussion

The Subcommittee determined that current fleet policies and purchasing guidelines were sufficiently flexible to allow low emission and/or alternative fuel vehicles to be procured, with proper justification as may be needed, for most operational needs. There are a number of occasions where a Ford Taurus (which is a flex-fuel vehicle that can operate on E85) can be substituted for an SUV. However, no SUVs are currently available from auto manufacturers in a configuration designed for use with an alternative fuel. As hybrid passenger cars and light duty trucks become available, they should be included on the list of approved vehicles for purchase by the State, although hybrid vehicles do not qualify as AFVs under EPACT.

The 50% use goal could be met if: a) better use were made of CNG from available fueling facilities and if the existing information on CNG fueling sites and fueling procedures were used more effectively by the staff that operate CNG vehicles; and b) there were sufficient quantities of E85 available at reasonably convenient fueling facilities to serve the existing E85 flex-fuel. Information on fueling facility locations and vehicle refueling procedures has been developed for use by State staff and is available on the DGS Web site (www.dgs.state.md.us) and in hard copy. A State commitment will be needed to provide the additional funds needed to cover the added cost of vehicles, fuels, fueling facilities, and the maintenance and operation of fueling facilities. Technologies that allow prompting to fuel a vehicle with the alternative fuel (at a fueling facility) might help to "remind" drivers to fuel with the alternative fuel instead of conventional fuel.

Presently there are no E85 refueling facilities in the State. The need for E85 fueling facilities is being quantified by MDOT and the locations to achieve best effectiveness is being assessed. MDOT is completing an analysis of existing CNG fueling facility locations and CNG vehicle operating locations.

The environmental benefits of using "clean energy" transit vehicles and alternative fuel technologies can provide a significant opportunity to the State by giving it the flexibility it may need to meet future transportation conformity or EPA air quality requirements.

Recommendations

Recommendations for each goal are as follows:

Goal No. III-1: Revise fleet policy and purchasing guidelines to offer more flexibility in purchasing, where practical, low emission and alternative fuel vehicles for the State's fleet:

- Expand awareness of AFV options to agency managers and encourage them to procure AFV's where practical.
- Provide financial support for funding the incremental cost of CNG and other higher cost AFV's.
- Whenever possible, assign AFV's to staff that have vehicles assigned to them.
- Whenever possible and practical, substitute a Ford Taurus flex-fuel vehicle for an SUV.
- Develop and implement a Fleet Manager's "Buyers Education Program" that provides Department/Agency fleet managers with the educational information they need to acquire and use AFVs effectively. This can be accomplished via a series of informational memos and a short series of workshops.
- Whenever possible and practical, incorporate the use of B20 in the State's fleet of diesel

engine vehicles and equipment, and encourage its use by contractors that do construction and maintenance work for the State.

Goal No. III-2: Ensure that for fleet units operating bi-fuel or flex-fuel vehicles, an average of 50% of the fuel used by those vehicles is alternative fuel:

- Require that managerial and staff commitments at all Agency levels be made to ensure that this goal can be met.

- Incorporate performance objectives and the means to monitor and measure performance achievement into the agency performance and personnel performance review process.

- Review and adopt, where practical, technologies that prompt drivers to fuel with the alternative fuel rather than the conventional fuel, at refueling facilities.

  Maximize the environmental benefits of alternative fuels by focusing on AFV and alternative fuel vehicle use in the urban, air-quality non-attainment areas of metropolitan Baltimore and Washington, DC. Since the maximum emission reduction benefit is derived from vehicles designed to operate on alternative fuel exclusively, emphasis should be placed on purchasing dedicated fuel vehicles.

- Instill and provide the managerial commitment at all agency levels that is needed to ensure that this goal provision can be met.

- Maximize the environmental benefits of alternative fuels by focusing on AFV and alternative fuel use in the urban, air quality non-attainment areas of metropolitan Baltimore and Washington DC.

- Explore the opportunity to collect fuel information at the refueling dispenser and link that use data to the State's fuel use tracking system.

- Develop and maintain an Employee Training program on the benefits, use, and fueling of AFVs, fueling facility locations, etc. Couple this training program with the current driver safety training and new employee orientation programs.

Goal No. III-3: Help develop the refueling and maintenance infrastructure required to make certain types of AFV's practical.

- Provide the financial commitment to acquire and pay for the cost of maintaining and operating the facilities, and purchase the fuels needed to achieve this goal. Review and pursue Federal and State agency incentives that may be available to support goal achievement, while minimizing the cost to the State.

- Construct E85 fueling facilities in Annapolis and the Baltimore State office building complex to permit fueling of the maximum number of E85 flex-fuel vehicles.

- Evaluate current CNG fueling locations and the need for locating any additional CNG fueling facilities to maximize the fueling of CNG vehicles within the State fleet.

- Identify opportunities for leveraging the availability of existing, non-State owned fueling facilities to potentially serve State fleet vehicles, and for leveraging the use of current State fueling facilities to a broader segment of non-State alternative fuel users, if practical.

Goal No. III-4: Provide technical assistance and other incentives to use clean energy, where practical, in State transit fleets:

- Perform a study of the transit bus operations in the State, with emphasis given to those transit operations in the urban areas of metropolitan Baltimore and Washington DC, to determine which of the clean vehicle/fuel technologies provides the best balance of air quality benefits, cost, and operational suitability.

- Based on the results of Recommendation No.1 above, develop an implementation and incentive plan for a long-term program for converting the State's transit fleet to clean vehicles and fuel technologies.

- Make the financial commitment for implementing the plan and carry out the plan.

- Perform a similar analysis and develop an implementation plan for the school bus fleets that operate within the State.

Pollution Prevention Subcommittee

Executive Order Requirements

Beginning on January 1, 2003, State agencies shall annually divert or recycle at least 20% of the waste they generate.

Summary of Issues

In 1988, the Maryland Recycling Act required each county in Maryland to incorporate recycling as a meaningful component of their solid waste management program. All of Maryland's counties and Baltimore City have successfully accomplished this mandate. In 2000, Marylanders recycled 36% of the waste they generated.

The Act also required State agencies to develop recycling plans that reduce the amount of their solid waste stream generated for disposal by at least 10%. The Maryland Department of the Environment (MDE) established the "All StAR" (All State Agencies Recycle) program to facilitate this recycling effort.

MDE offers technical assistance to agencies as they establish or improve their programs. MDE performs waste audits to help refine and focus recycling programs, and publishes a quarterly newsletter for agencies to provide information on statewide success in recycling.

Not every State agency has fully incorporated recycling into their day-to-day operations, despite some demonstrated cost savings from successful recycling efforts.

At a December 2000 Governor's cabinet meeting, all State agency Secretaries were advised of the Governor's strong commitment to recycling. A six-month status report to determine progress in recycling efforts was requested.

Current Efforts

The State of Maryland has been a leader in setting mandatory state government goals and tracking progress towards those goals. However, additional work still needs to be done.

The recycling rate for State government offices during the past three years has slipped from 18% in 1998 to 15.5% in 2000, based on data reported by State agencies. **Figure 1** illustrates the progress of these programs over the past decade.

The 6-month cabinet review will occur soon along with recommendations from the agency Secretaries for further enhancements.

Discussion

Pollution Prevention Subcommittee Summary

The Subcommittee agreed that the report should be categorized into two main topics of recommendations. The first area addressed involves state procurement policies, agency waste disposal contractual agreements, and associated funding needs. The second area focuses on enhancement of the outreach programs currently in place, both inter-modal outreach (across all State agencies) and intra-modal programs (within each individual agency).

The Subcommittee also agreed there should be coordination between recycling contrators and the agencies requesting recycling services. In other words, a contractual committment should meet the needs of the agency. For those agencies that lease their space, this service should be written into the lease document.

It was acknowledged that State agencies are faced with specific challenges, which are influenced both by external forces (no direct oversight of their waste disposal collection contract, or no staging areas for recyclable materials) and internal forces (no money to buy recycling bins). The Subcommittee agreed that accountability and incentives were key issues to improve recycling.

Description of Benchmarks

MDE's recycling webpage (www.mde.state.md.us/was/recycle) provides resources and updated information for all State agencies. Six-month and annual All StAR Recycling Surveys will be used to gauge the progress of State agencies in meeting the goal.

Progress Towards Benchmarks

All StAR Recycling Statistics
1998 - 2000

Year	1998	1999	2000	2001 6 - month
No. of Sites	313	261	267	268
No of Sites Reported	297	241	247	205
Reporting Rate (%)	94.9	92.3	92.5	76.5
Waste Disposed	66,986.56	58,313.25	72,712.88	24,774.14
Non-MRA Tonnage	44,970.60	39,498.49	43,117.47	35,396.39
MRA Tonnage	14,778.69	11,996.56	13,380.88	6,339.39
Recycling Rate (%)	**18.1**	**17.1**	**15.5**	

Recommendations

- Encourage the use and expand the availability of items made from recycled content offered on State procurement contracts. The DGS website (www.dgs.state.md.us) includes a database of recycled materials offered under State contract.

- Ensure opportunities for the recycling of computers and other electronics from State agencies.

- Increase opportunities for State agencies to procure environmentally preferable products including carpet, paint, toner cartridges, and ceiling tiles manufactured with recycled content and energy saving equipment.

- Pursuant to Maryland regulations, fully implement the price preference provisions for the purchase of recycled products by State agencies.

State Agency Responsibilities

Each State agency shall:

- Ensure necessary funding for recycling collection services and address potential impediments.
- Have a sufficient number of recycling collection bins placed in convenient and appropriate locations with contact information for the agency's recycling program.

- Confirm a recycling coordinator for each State agency and satellite office as is required to direct and oversee the agency/satellite office's recycling program. This responsibility should be incorporated in the employee's position (MS 22) description and be an element in the performance evaluation (PEP) to ensure accountability. Each unit within an agency shall appoint an employee to participate on an agency recycling committee.
- Provide information on the agency "intranet" website about their agency recycling program and provide a link to MDE's Recycling Homepage.
- Ensure that the Governor's Executive Order regarding double-sided copying is enforced to the maximum extent possible.
- Encourage the purchase of items made from recycled content and other products that reduce the waste stream.
- Provide employee incentives for recycling such as allowing monies received from the sale of recycled materials be used to further enhance office recycling efforts.
- Establish an agency Managing for Results (MFR) objective and performance measurement to ensure that each State agency is accountable for annually diverting or recycling at least 20% of the waste they generate.

Department of General Services (DGS) Responsibilities

By June 30, 2002, DGS will review and ensure that all State agency building leases include appropriate locations for recycling bins, contact personnel, material staging, and address logistical issues related to collection of source separated recyclables.

Contracts for janitorial services and trash/recycling material collections in all government buildings shall demonstrate accountability through "performance contracting," rating a contractor's compliance with the recycling provisions of their contract and consistently using that rating as a determining factor for future bidding.

Maryland Department of the Environment (MDE) Responsibilities

MDE shall:

- Provide recognition to agencies for waste diversion activities such as buying recycled materials, reducing the use of virgin materials, and promoting recycling through specific education and outreach initiatives.
- Develop outreach templates that may be customized for individual agency use.
- Increase technical assistance to State agencies by conducting regular site visits to enhance recycling programs.
- Inform State employees about recycling information available on the MDE Recycling Homepage via State employee paychecks.
- Benchmark the AllStAR program against successful State and county programs across the region and adopt proven program enhancements.

Recognition/Incentive Program

Reward most improved State agencies and agencies with the highest recycling rate and lowest waste production per employee through the Governor or the Green Buildings Council.

Recognize State agencies with the highest recycling rates via messages on all State Employee paycheck stubs.

Next Steps

Explore implementation options to create a 30% waste diversion goal to include measurable credit up to 10% for source reduction activities in State agency offices in addition to the 20% recycling goal.

Develop an evaluation mechanism to gauge the effectiveness of the Subcommittee's recommendations.

Develop a series of consequences (ranging from charging agencies a penalty, to requiring a written explanation) for agencies that either fail to report their recycling data in a timely fashion or fail to meet the 20% recycling requirement.

Appendix A:
Executive Orders, Maryland Legislative House Bills and Resolution

Alternative Fuel Vehicle Subcommittee Executive Order 01.01.2001.02 - ***Sustaining Maryland's Future with Clean Power, Green Buildings and Energy Efficiency***
Executive Order 01.01.2001.06 - ***Water Conservation by State Agencies***
Executive Order 01.01.2001.07 - ***Task Force on Energy Conservation and Efficiency***
House Joint Resolution 14 of 2001- ***Task Force to Study Lighting Efficiency and Light Pollution in Maryland***
House Bill 8 of 2001 - ***Income Tax Credit for Green Buildings***
House Bill 20 of 2000 - ***Maryland Clean Energy Incentive Act***

Environmental & Conservation Initiatives

Executive Order 01.01.2001.02
Sustaining Maryland's Future with Clean Power, Green Buildings and Energy Efficiency

Executive Order 01.01.2001.06
Water Conservation by State Agencies

Executive Order 01.01.2001.07
Task Force on Energy Conservation and Efficiency

House Joint Resolution 14
Task Force to Study Lighting Efficiency and Light Pollution in Maryland

Parris N. Glendening
Governor

Kathleen Kennedy Townsend
Lt. Governor

Peta N. Richkus
Secretary

Richard F. Pecora
Deputy Secretary

STATE OF MARYLAND

EXECUTIVE ORDER

01.01.2001.02

Sustaining Maryland's Future with Clean Power,

Green Buildings and Energy Efficiency

WHEREAS, The State of Maryland has consistently demonstrated a commitment to preserve and enhance our precious natural resources, particularly the Chesapeake Bay, for the enjoyment of future generations;

WHEREAS, Maryland's economy and the health and quality of life of its citizens are dependent on the careful stewardship of its environmental resources;

WHEREAS, Emissions of various pollutants from numerous sources such as power plants, vehicles, small businesses and industry contribute to detrimental human health and environmental impacts, including decreased respiratory health caused by ground-level ozone smog, global climate change, limited visibility and nitrogen deposition into local waters and the Chesapeake Bay, which has caused a large portion of Maryland to be identified as a serious or severe ozone non-attainment area by the United States Environmental Protection Agency;

WHEREAS, Excessive and improperly shielded outdoor lighting results in glare, energy waste, light trespass and sky glow; can be corrected through the implementation of policies and designs incorporating high efficiency lighting techniques, and will result in energy savings and cost reductions;

WHEREAS, Maryland administers several grant and loan programs that seek to increase energy efficiency in non-profit, local government and State buildings by reducing energy consumption, and has met goals regarding the reduction of State energy usage through energy performance contracting programs;

WHEREAS, Maryland is the first official partner with the United States Department of Energy's Million Solar Roofs Program, which promotes the installation of 1 million solar roofs throughout the United States by 2010;

WHEREAS, The Governor and the General Assembly have enacted legislation promoting clean energy sources, including the "Maryland Clean Energy Incentive Act" that provides tax incentives for energy efficient appliances, for electric power generation using renewable energy sources and for the purchase of electric and hybrid vehicles;

WHEREAS, In support of the Governor's Smart Growth and Neighborhood Conservation Initiative, actions have been taken to increase the awareness of using energy efficient and environmentally responsible building practices, sustainable materials and ecologically sound site designs that provide comfortable, affordable and healthier buildings for Maryland's residents and workforce;

WHEREAS, The State of Maryland is one of the largest owners and operators of buildings and will continue to construct and/or renovate facilities over the years, which will provide opportunities to incorporate green building and green development principles and techniques and demonstrate its

commitment to enhancing the natural environment while realizing economic savings;

WHEREAS, "Green Building" is a philosophy of building design and construction which incorporates the following concepts: using natural resources efficiently; considering the impact of buildings on the local, regional and global environment; reducing building footprint size; allowing ecosystems to function naturally; conserving and reusing water; treating storm water on-site; maximizing the use of local materials; optimizing energy performance by installing energy efficient equipment and systems; optimizing climatic conditions through site orientation and design; integrating natural day-lighting and ventilation; minimizing the use of mined rare metals and persistent synthetic compounds; and minimizing construction waste by reducing, reusing and recycling materials during all phases of construction and deconstruction; and

WHEREAS, The Chesapeake 2000 Agreement reaffirms Maryland's commitment to lead by example in reducing nutrient pollution into the Chesapeake Bay and its tributaries by addressing the sources of airborne nitrogen deposition with the expansion of clean vehicle technologies, green building techniques and other energy efficient approaches.

NOW, THEREFORE, I, PARRIS N. GLENDENING, GOVERNOR OF THE STATE OF MARYLAND, BY VIRTUE OF THE AUTHORITY VESTED IN ME BY THE CONSTITUTION AND THE LAWS OF MARYLAND, HEREBY PROCLAIM THE FOLLOWING EXECUTIVE ORDER, EFFECTIVE IMMEDIATELY:

A. Clean Energy Procurement Goal.

(1) For purposes of this Executive Order, "Green Energy" is defined as energy generated from the wind, solar photovoltaic, solar thermal, biomass, landfill gas and the combustion of municipal solid waste.

(2) For the procurement of electricity for use within State owned facilities, the State of Maryland has a goal of 6% to be generated from Green Energy. No more than 50% of the total Green Energy procurement shall be derived from the combustion of municipal solid waste.

(3) In the selection of a power generation contractor chosen through the procurement process, priority consideration should be given to companies that produce green power in Maryland. The chosen contractor shall obtain certification from a State approved accreditation process that the company has met the Green Energy goal.

B. High Efficiency Green Buildings Program.

(1) The State shall develop a High Efficiency Green

Buildings Program committed to utilizing energy efficient and environmentally responsible approaches in the design, construction, operations, maintenance and deconstruction of all new and, to the extent possible, existing State owned and leased facilities.

(2) There is a "Maryland Green Buildings Council" (the Council). The Council shall be Chaired by the Secretary of the Department of General Services and include:

(a) The Secretary, or a designee of the following agencies:

i. The Department of Budget and Management;

ii. The Department of the Environment;

iii. The Department of Natural Resources;

iv. The Department of Public Safety and Correctional Services;

v. The Department of Transportation;

vi. The Department of Housing and Community Development;

vii. The Department of Planning;

viii. The Maryland Energy Administration;

ix. The Public School Construction Program; and

x. The University System of Maryland.

(b) Six members appointed by the Governor to represent environmental, business and citizen interests, one of whom has expertise in energy conservation and/or production. Members appointed by the Governor shall serve at his pleasure for renewable and staggered 4-year terms.

(c) Members appointed by the Governor may not receive compensation, but may receive reimbursement for necessary and proper expenses directly related to their duties on the Council, in accordance with the Standard State Travel Regulations as provided in the State budget.

(d) Staff support to the Council shall be provided by the Department of General Services, with assistance as necessary to be furnished by other involved agencies and units of State government.

(3) The Council is charged with creating the High Efficiency Green Buildings Program. Within 180 days of its inception, the Council shall make recommendations to the Governor regarding appropriate criteria, standards and a numeric rating system (modeled after the United States Green Building Council's *Leadership in Energy and Environmental Design* (LEED) Green Building Rating System and the federal *Energy Star* Program) for use by the Program.

(4) Upon acceptance of the appropriate criteria, standards,

and a numeric rating system, the High Efficiency Green Buildings Program shall be fully adopted in the design, construction, operations, maintenance and deconstruction of new State owned and leased facilities. Reasonable effort should be made to incorporate these standards into the construction of all new facilities designed before the issuance of this executive order.

(5) For all existing State owned, leased and operated buildings, reasonable efforts shall be

made to maximize the use of energy efficiency and resource conservation techniques.

(6) The Council shall also have the following additional responsibilities:

(a) The Council shall annually reevaluate the Clean Energy Procurement Goal contained in Section A above;

(b) The Council shall consider additional State energy efficiency, energy production and sustainability issues and policies;

(c) The Council shall develop a comprehensive set of initiatives known as the "Maryland Greenhouse Gas Reduction Action Plan;" and

(d) The Council shall report annually to the Governor and to the General Assembly on the efforts of State agencies in the implementation of High Efficiency Green Buildings Program goals, Clean Energy Procurement Goal, the Greenhouse Gas Reduction Plan, and other energy efficiency, energy production and sustainability issues or policies the Council may have considered.

C. Additional Energy Efficiency Goals.

(1) Energy Efficiency Improvement Goal: The State, through cost-effective energy measures, shall reduce energy consumption per gross square foot of its facilities by 10% by 2005 and 15% by 2010 relative to 2000 baseline.

(2) Renewable Energy Project Goal: The State shall expand the use of renewable energy within its facilities, including supporting the federal Million Solar Roofs program.

(3) Efficient Product Purchase Goal: The State shall

purchase Energy Star products when purchasing energy-using products, including computers, printers, copiers and other office equipment, or shall purchase products in the top 25% in energy efficiency for products where labels are not available.

(4) Pollution Prevention Goal: Beginning on January 1, 2003, State agencies shall annually divert or recycle at least 20% of the waste they generate.

(5) Alternative Fuel Vehicles Goal: Consistent with the goals of the Chesapeake 2000 Agreement, the State shall revise fleet policy and purchasing guidelines to offer more flexibility in purchasing, where practical, low emission and alternative fuel vehicles for its fleet. The State shall ensure that for fleet units operating bi-fuel or flex-fuel vehicles (vehicles that operate on either motor gasoline or an alternative fuel, as defined by the Federal Energy Policy Act) an average of 50% of the fuel used by those vehicles shall be alternative fuel. The State shall help develop the refueling and maintenance infrastructure required to make certain types of alternative fuel vehicles practical and may provide technical assistance and other incentives to use clean technology, where practical, in State transit fleets.

GIVEN Under My Hand and the Great Seal of the State of Maryland, in the City of Annapolis, this 13th Day of March, 2001.

_____
Parris N. Glendening
Governor

ATTEST:

_____
John T. Willis
Secretary of State

STATE OF MARYLAND

EXECUTIVE ORDER

01.01.2001.06

Water Conservation by State Agencies

WHEREAS, The demand for water to meet the needs of Maryland's citizens, businesses, industries, agricultural enterprises and all other beneficial purposes continues to increase as the State's population and economy expands;

WHEREAS, Increased water demands place additional burdens on the State's water resources and on the State's water-dependent living resources;

WHEREAS, Greater efficiency in water use and the elimination of wasteful water use practices can result in significant reductions in overall withdrawals from the State's rivers, streams and aquifers; and

WHEREAS, Improvements in water conservation at State facilities can achieve such reductions, and set a clear example of the State's commitment to water conservation.

NOW, THEREFORE, I, PARRIS N. GLENDENING, GOVERNOR OF THE STATE OF MARYLAND, BY VIRTUE OF THE AUTHORITY VESTED IN ME BY THE CONSTITUTION AND THE LAWS OF MARYLAND, HEREBY PROCLAIM THE FOLLOWING EXECUTIVE ORDER,EFFECTIVE IMMEDIATELY:

A. Water Conservation Goal.

(1) State agencies, through water conservation measures, shall reduce water consumption by at least seven percent (7%) by the year 2003, at least eight percent (8%) by the year 2005, at least nine percent (9%) by the year 2007, and at least ten percent (10%) by the year 2010, relative to baseline water use in the year 2000.

(2) For the purposes of this Executive Order, water conservation measures will apply to facilities owned, leased or managed by any State agency. This Executive Order does not apply to water production and supply functions.

B. Water Use Audit.

(1) A water use audit, which is a measurement and accounting of the amount of water conveyed through the water distribution system to water users, shall be conducted annually at all State owned or leased facilities by the State agency responsible for the

lease or maintenance of the facility. Additionally, the audit will inventory all water fixtures and other water use devices to determine which are inefficient and the results shall be reported to the Maryland Department of the Environment (MDE) by July 1, 2001.

(2) During the water use audit, the State agency shall also identify any water conservation measures for immediate implementation.

C. Water Conservation Plan.

(1) Each State agency responsible for the lease or maintenance of a facility shall immediately designate a water conservation coordinator who is responsible for the annual development and implementation of the agency's water use audit and water conservation plan. An agency coordinator may further designate coordinators for each facility, who will ensure that all aspects of the plan are appropriately implemented. Each responsible State agency will complete and submit to MDE a water conservation plan by October 1, 2001. A water conservation plan shall include the following fundamental elements and explain how each element is to be implemented:

(a) An annual water audit: The use of flow meters or other methods to routinely account for water use shall be used to demonstrate that the water use reduction goals are achieved and that inefficient water fixtures and water use devices are being eliminated; and

(b) Identify and select specific water conservation measures that need to be employed to improve water management and water use efficiency to achieve the water conservation goal of this Executive Order.

(2) Additionally, each responsible State agency shall address the following measures in its water conservation plan:

(a) The purchase of water-efficient plumbing fixtures, appliances and other products when new or replacement products are needed;

(b) The timely detection and repair of leaks in distribution lines and plumbing fixtures;

(c) Wastewater reclamation and recycling of water for nonpotable applications;

(d) Management of system pressure so as to reduce usage;

(e) Retrofit programs and fixture replacement; and

(f) Installation of efficient landscape design and irrigation techniques.

(3) All leases, beginning in FY02, by any State agency shall include water conservation measures as a term of the lease.

D. Water Conservation Education.

In support of the goal to reduce water consumption, all agencies will conduct an information and education program for both public and staff users designed to promote increased efficiency of water use at State facilities to be completed on or before December 1, 2001. The information and education program shall use visual displays, distribution of written material, dissemination of information through existing employee communications and other appropriate means to raise employee and citizen user awareness of the importance of water conservation.

E. Water Conservation Reporting.

(1) On December 1, 2001, and every year thereafter, each responsible State agency shall report to the Maryland Green Buildings Council and MDE in a format provided by the Department on measures taken to reduce water use at each of its State-owned and State-leased facilities. The reports should include results from the water use audit and steps outlined in the water conservation plan.

(2) The agency reports shall be reviewed to ensure that the most appropriate water conservation measures are implemented. The Green Buildings Council, in consultation with MDE, shall determine and approve appropriate water conservation measures. The Green Buildings Council, in consultation with MDE, will annually reevaluate the water conservation goal contained in Section A above, and may waive water conservation requirements where an agency is able to demonstrate that water conservation has been optimized and further reductions are not structurally feasible.

(3) Each year the Maryland Green Buildings Council and MDE shall submit a report to the Governor regarding the effectiveness of State agencies' water conservation measures in meeting the overall water use reduction goals.

GIVEN Under My Hand and the Great Seal of the State of Maryland, in the City of Annapolis, this 17th Day of May, 2001.

_____

Parris N. Glendening
Governor

ATTEST:

_____

John T. Willis
Secretary of State

STATE OF MARYLAND

EXECUTIVE ORDER

01.01.2001.07

Task Force on Energy Conservation and Efficiency

WHEREAS, The State of Maryland has consistently demonstrated a commitment to preserve and enhance its precious natural resources, particularly the Chesapeake Bay, for the enjoyment of future generations;

WHEREAS, Careful stewardship of Maryland's energy and environmental resources is crucial to the health and quality of life of Maryland's citizens;

WHEREAS, Energy consumption is rising at an average rate of 2 percent per year, contributing to increased emissions of environmental pollutants and incidences of asthma and other respiratory conditions, negative environmental impacts and concerns regarding energy reliability;

WHEREAS, Maryland's economy, particularly its fast-growing high-technology sector, is dependent on a stable, reliable energy system which energy efficiency programs can promote;

WHEREAS, Comprehensive energy conservation and efficiency programs help ensure access to reasonably priced, reliable energy and benefit all by reducing the cost of energy and potential negative environmental impacts; and

WHEREAS, In order to develop and design a statewide energy efficiency initiative, it is necessary to assess the current trends in energy use, which will allow the State to identify cost-effective opportunities for energy efficiency and conservation in all sectors, including residential, commercial, industrial and transportation.

NOW THEREFORE, I, PARRIS N. GLENDENING, GOVERNOR OF THE STATE OF MARYLAND, BY THE VIRTUE OF THE AUTHORITY VESTED IN ME BY THE CONSTITUTION AND THE LAWS OF MARYLAND, HEREBY PROCLAIM THE FOLLOWING ORDER, EFFECTIVE IMMEDIATELY:

A. Establishment. There is a Task Force on Energy Efficiency in Maryland.

B. Membership and Procedures.

(1) Membership. The Task Force shall be chaired by the Director of the Maryland Energy Administration and consist of the following members:

(a) A member of the Senate of Maryland appointed by the

President of the Senate;

(b) A member of the House of Delegates appointed by the Speaker of the House;

(c) The Secretary of Business and Economic Development or a designee;

(d) The Secretary of Environment or a designee;

(e) The Secretary of Housing and Community Development or a designee;

(f) The Secretary of Natural Resources or a designee;

(g) The Secretary of Transportation or a designee;

(h) The Secretary of Agriculture or a designee;

(i) The Chair of the Public Service Commission or a designee;

(j) The People's Counsel or a designee; and

(k) Up to 8 members appointed by the Governor to represent energy consumers, producers and/or providers, environmental organizations and members of the public with relevant interest or expertise.

(2) The members of the Task Force shall not receive any compensation for their services, but may receive reimbursement for reasonable expenses incurred in the performance of their duties in accordance with the Standard State Travel Regulations and as provided in the State budget.

(3) The Maryland Energy Administration and the Department of Natural Resources shall provide staff support to the Task Force.

(4) The Task Force shall meet at times determined by the Chair of the Task Force.

C. Duties. The duties of the Task Force shall include the following:

(1) Evaluate historic, current and projected energy use in order to determine an energy reduction goal for the State.

(2) Recommend strategies to attain the energy reduction goal, along with a schedule for proposed reductions, as part of a long-term plan to address energy conservation in Maryland.

(3) Evaluate current energy use in the residential, commercial, agricultural, industrial and transportation sectors in order to identify opportunities for energy savings in each sector and to prioritize energy conservation measures.

(4) Investigate the various commercial, consumer and institutional barriers to investments in energy-efficiency measures and recommend solutions to overcome these barriers.

(5) Determine the most effective elements of an energy conservation program, including removing bureaucratic restraints, providing technical assistance, increasing conservation incentives and creating public awareness programs.

(6) Document anticipated energy savings resulting from proposed conservation measures taking into account projected population growth.

D. Schedule. On or before December 15, 2001, the Task Force shall report its finding to the Governor and provide him with policy, legislative and program recommendations to encourage more efficient use of energy in each of the major user sectors. The report shall also include recommended implementation strategies, including communications and public outreach initiatives as well as a long-term plan to address energy conservation in Maryland.

GIVEN Under My Hand and the Great Seal of the State of Maryland, in the City of Annapolis, this 1st Day of June, 2001.

_____
Parris N. Glendening
Governor

ATTEST:

_____
John T. Willis
Secretary of State

HOUSE JOINT RESOLUTION 14

Unofficial Copy 2001 Regular Session
M1 (1lr0868)

ENROLLED RESOLUTION

-- Appropriations/Economic and Environmental Affairs --

Introduced by **Delegates Kopp, Barkley, Bronrott, Cadden, Clagett, Conroy, Cryor, D'Amato, Dypski, Goldwater, Grosfeld, Harrison, Howard, Hubbard, Hubers, Hurson, Love, Mandel, McIntosh, Menes, Morhaim, Petzold, and Shriver**

Read and Examined by Proofreaders:

_____
Proofreader.

_____
Proofreader.

Sealed with the Great Seal and presented to the Governor, for his approval this _____ day of _____ at _____ o'clock, _____M.

_____
Speaker.

RESOLUTION NO._____

A House Joint Resolution concerning

Task Force to Study Lighting Efficiency and Light Pollution in Maryland

FOR the purpose of establishing a Task Force to study the cost, extent, and consequences of inefficient public lighting and light pollution in the State and benefits of alternative improvements; providing for the membership and appointment of the Task Force; providing for the duties of the Task Force; requiring the Department of General Services to coordinate the professional and administrative support of the Task Force; requiring the Task Force to report to the General Assembly by a certain date; and generally relating to the Task Force to Study <u>Lighting Efficiency and</u> Light Pollution in Maryland.

WHEREAS, State and local governments and other public bodies, including the University System of Maryland, spend millions of dollars each year on lighting roads, buildings, and campuses and are also responsible for setting lighting standards and policies throughout the State; and

WHEREAS, Too often public funds are spent on lighting which is not optimally efficient, can waste both funds and energy, causes glare which does not enhance public safety and often causes light trespass and light pollution, and can threaten the very survival of amateur and professional astronomy, thereby reducing opportunity for children and others to appreciate the beauties of the night sky; and

WHEREAS, Good lighting policies save public funds while enhancing public safety; and

WHEREAS, Several agencies of State and local government have begun individually and separately to examine lighting policies and standards with the goal of enhancing efficiency, reducing cost, and reducing pollution, and would benefit from a joint examination of the problems and opportunities inherent in improved policies and practices and in exchange of information with experts such as representatives of the standards-setting Illuminating ~~Engineers Association~~ Engineering Society of North America; now, therefore, be it

RESOLVED BY THE GENERAL ASSEMBLY OF MARYLAND, That there is a Task Force to study the cost, extent, causes, and consequences of current public lighting standards and policies, light pollution, and the benefits of alternative policies in Maryland; and be it further

RESOLVED, That the Task Force shall be composed of ~~22~~ 23 members, as follows:

(1) Two members from the Senate of Maryland, designated by the President of the Senate;

(2) Two members from the House of Delegates, designated by the Speaker of the House;

(3) One representative from the Department of the Environment, designated by the Secretary;

(4) One representative from the Department of Natural Resources, designated by the Secretary;

(5) One representative from the Department of General Services, designated by the Secretary;

(6) One representative from the Maryland Energy Administration, designated by the Director;

(7) One representative from the University System of Maryland, designated by the Chancellor of the University;

(8) The Dean of the College of Computer, Mathematical and Physical Sciences of the University of Maryland, College Park, or the Dean's designee;

(9) Two representatives from the Maryland Department of Transportation, ~~including the Bicycle and Pedestrian Director and an official involved in the State Highway lighting program,~~ designated by the Secretary of Transportation;

(10) One representative from the Department of Business and Economic Development, designated by the Secretary;

(11) One representative from a County currently officially examining lighting policy and standards, designated by the Maryland Association of Counties;

(12) One representative of a municipality currently officially examining local lighting policy and standards, designated by the Maryland Municipal League;

(13) One representative from the Illuminating Engineering Society of North America, designated by the Executive Director of the Society;

(14) ~~Six~~ Seven members appointed by the Governor as follows:

(i) One representative of the professional astronomy community;

(ii) One representative of the amateur astronomy community;

(iii) One representative of an environmental group with expertise in the effects of artificial light on wildlife;

(iv) One representative of the public electric utility industry with a major role in road or exterior lighting;

(v) One representative of State or local law enforcement; ~~and~~

(vi) One representative from science educators at the secondary school level; and

(vii) One expert in human reactions to artificial light; and be it further

RESOLVED, That the Governor shall designate the Chairman of the Task Force; and be it further

RESOLVED, That the Department of General Services shall coordinate with other State agencies, including the University of Maryland, to provide professional and administrative support to the Task Force; and be it further

RESOLVED, That a member of the Task Force:

(1) May not receive compensation; but

(2) Is entitled to reimbursement for expenses under the Standard State Travel Regulations as provided in the State budget; and be it further

RESOLVED, That the Task Force shall:

(1) Estimate the potential fiscal and energy costs and savings, including the potential impact on the State budget and the budgets of county and municipal jurisdictions in the State, associated with the adoption of lighting practices that minimize inefficient lighting, light pollution, and energy waste while meeting important illumination and safety lighting requirements; and

(2) Study and document *the benefits of lighting to the public, including those who use Maryland's highways, airways, and other travelways, and* the consequences of light pollution in Maryland, including its impact on driving safety, general community safety, birds and other nocturnal fauna, astronomical research observation, the natural beauty of the night sky, and any other consequences the Task Force determines are appropriate for its attention;

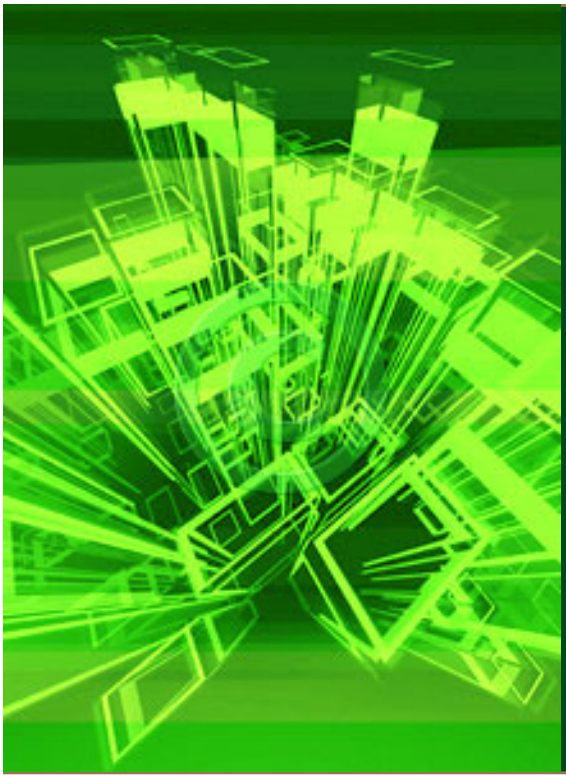
(3) Survey and document the technology and standards currently available to minimize light pollution; and

(4) Prepare recommendations for public and private action to enhance lighting efficiency and minimize light pollution in Maryland, including, but not limited to, appropriate standards or policies for consideration by appropriate State agencies, counties, or municipal corporations in the State; and be it further

RESOLVED, That the Task Force shall issue a preliminary report of its findings and recommendations to the General Assembly, subject to § 2-1246 of the State Government Article, on or before October 15, 2001, and shall issue a final report of its findings and recommendations to the General Assembly on or before February 1, 2002; and be it further

RESOLVED, That a copy of this Resolution be forwarded by the Department of Legislative Services to the Honorable Parris N. Glendening, Governor of Maryland; the Honorable Thomas V. Mike Miller, Jr., President of the Senate of Maryland; and the Honorable Casper R. Taylor, Jr., Speaker of the House of Delegates.

Appendix B:
Maryland's High Efficiency Green Buildings Program



2001 Maryland Green Building Council

High Efficiency Green Buildings Program

Parris N. Glendening
Governor

Kathleen Kennedy Townsend
Lt. Governor

Peta N. Richkus
Chair, Green Building Council
Secretary, DGS

Richard F. Pecora
Deputy Secretary
DGS

MARYLAND GREEN BUILDINGS COUNCIL
"HIGH EFFICIENCY GREEN BUILDINGS PROGRAM"
November 1, 2001

A. INTRODUCTION

A.1 A Brief history and overview of Executive Order 01.01.2001.02 -- Sustaining Maryland's Future with Clean Power, Green Buildings and Efficient Energy.

On March 13, 2001, The Executive Order was signed by Governor Parris N. Glendening establishing the Maryland Green Buildings Council. The Council, in turn, established the High Efficiency Green Buildings Program. The Program requires that eligible buildings constructed by the State shall meet minimum standards of efficiency based on the United States Green Building Council's Leadership in Energy and Environmental Design (LEED™) Green Building Rating System. Maryland is the first state to officially adopt the LEED system standards to its building projects.

A.2 Building "Green"

"Green Building" is a philosophy of building design and construction which incorporates the following concepts: using natural resources efficiently; considering the impact of buildings on the local, regional, and global environment; reducing building footprint size; allowing ecosystems to function naturally; conserving and reusing water; treating stormwater on site; maximizing the use of local materials; optimizing energy performance by installing energy efficient equipment and systems; optimizing climatic conditions through site orientation and design; integrating natural day lighting and ventilation; minimizing the use of mined rare metals and persistent synthetic compounds; and minimizing construction waste by reducing, reusing and recycling materials during all phases of construction and deconstruction. "Green Building" design is an integrated, collaborative, team oriented process fundamentally advanced over the current state of building design.

A.3 The Program

The High Efficiency Green Buildings Program was written for the use of all State of Maryland agencies which design and build facilities or which prepare programs and budgets for the design and construction of their facilities. It is intended specifically for the use of project managers, capital planners and the professionals who will design state owned facilities. Section B describes compliance requirements for all state owned and leased facilities and provides additional information which should be considered by state agencies in the planning of their proposed facilities. Attachment B-a describes the requirements for design professionals engaged in the design of state facilities. These will also be included in the Department of General Services' Procedure Manual for Professional Services. Other agencies engaged in the design and construction of state facilities should provide this program to their design professionals. Attachment B-b provides suggested additions to Requests for Proposals (RFP) for state projects. Attachment B-c, reproduced with the permission of the US Green Building Council, provides the LEED™ Green Building Rating System Version 2.0 in its entirety. A companion volume, the LEED™ *Reference Guide June 2001 Edition* is available from the US Green Building Council (www.usgbc.com).

The High Efficiency Green Buildings Program will be reviewed on a yearly basis by the Maryland Green Buildings Council and revised as needed to address issues which may occur as this new way of constructing state facilities evolves. The LEED™ rating system is on a regular basis with the next revision anticipated to be released in March of 2005. Projects shall comply with the latest version in use at the time of the start of design. For all questions concerning this program or for information on registering your project with the LEED™ program, contact:

Maryland Green Buildings Council
c/o Department of General Services - Office of the Secretary
301 West Preston Street - Room 1401
Baltimore, Maryland 21201
(410) 767-4938

B. GREEN DESIGN AND CONSTRUCTION CRITERIA

The following criteria shall be applied to all State owned and leased projects funded for design in FY 2002 and beyond which have not yet initiated the Request for Proposal for the selection of an Architectural and Engineering consultant. All projects currently in design under previous funding shall not be required to meet these criteria. However, these projects shall be reviewed by their project teams, and reasonable efforts shall be made to incorporate Green Building principles where practical.

B.1 Criteria and Standards

1. All new buildings designed and constructed by State agencies and owned by the State shall meet or exceed the current version of the U.S. Green Building Council's LEED™ Green Building Rating System Silver rating. Wherever possible, projects shall strive for the LEED™ Gold rating. These projects shall be certified through the LEED™ certification process. Projects which will be required to be LEED™ Silver certified include all new construction projects larger than 7,500 gross square feet, with the exception of building types listed in Item 6 below.

2. All total renovations of existing buildings designed and constructed by State agencies and owned by the State or leased by the State from a private developer or landlord shall meet or exceed the current version of the U.S. Green Building Council's LEED™ Green Building Rating System Silver rating. Wherever possible, projects shall strive for the LEED™ Gold rating. These projects shall be certified through the LEED™ certification process. Projects which are required to be LEED™ Silver certified include all projects larger than 7,500 gross square feet with the exception of building types listed in Item 6 below. A total renovation is defined as a renovation in which the building shell (exterior walls, floors and roof) will be reused for the new construction. In total renovation projects, existing HVAC, electrical, and plumbing systems are to be replaced.

3. All interior renovations of existing State owned buildings, or interior renovations of portions of privately owned buildings to be leased by the State, shall meet or exceed the U.S. Green Building Council's LEED™ Green Building Interiors Rating System Silver rating. Wherever possible, projects should strive for the LEED™ Gold rating. (**Note**: At this time, the LEED™ Commercial Interiors rating system is being finalized. Projects shall use a draft version to be designated by the Green Building Council prior to the public release of this program in March 2003.) These projects shall be certified through the LEED™ certification process. Projects which are required to be LEED™ Silver certified include all projects which are larger than 5,000 net programmed square feet and which are to be designed by a licensed design professional. The building types listed below in Item 6 are not included.

4. All projects which are required to be LEED™ certified are encouraged to exceed the LEED™ Silver rating where possible.

5. All new projects of the types described above which are less than the required square footage shall have as a design goal the LEED™ Silver rating. However, projects in this category are not required to be LEED™ Silver certified. The project design professional shall submit a final report describing the building's "Green" features. See Attachment B-a Directions for Design Consultants.

6. All projects as described in Items 1 thru 3 above, and of the building types listed below, or similar building types (which are essentially unoccupied), are not required to be LEED™ Silver certified. However, the design of such facilities shall employ applicable Green Building principles wherever practical in their design and construction using the LEED™ Silver rating as a goal. The project design professional shall submit a final report describing the building's "Green" features. See Attachment B-a Directions for Design Consultants.

A. Warehouse /Storage Facilities
B. Garages
C. Maintenance Facilities
D. Transmitter Buildings
E. Pumping Stations
F. Similar Approved Building Types

7. The following is a list of LEED™ System credits which are mandatory for all projects which are required to be LEED™ Silver certified. Requirements for some of these credits may be mandatory under other State programs.

Sustainable Sites
1. Reduced Site Disturbance (1 point minimum)
2. Stormwater Management (1 point minimum)
3. Light Pollution Reduction
Water Efficiency
1. Water Use Reduction
Energy and Atmosphere
1. Optimize Energy Performance (minimum 2 points)
Materials and Resources
1. Construction Waste Management (1 point minimum)
2. Certified Wood
Indoor Environmental Quality
1. Increase Ventilation Effectiveness
2. Daylight and Views
3. Low Volatile Organic Compounds (VOC) Emitting Materials

B.2 Directives to State Agencies

1. Sites for eligible projects shall be selected in accordance with LEED™ criteria and Smart Growth principles. Sites shall be reviewed by the Department of Planning's Property Clearing House prior to final selection.

2. For special projects which may be desired by the agency to meet a Gold or Platinum LEED™ rating, the State agency shall identify this requirement and anticipated additional design and construction costs as early as possible in the Capital Budget cycle.

3. All projects which are required to be LEED™ Silver certified shall be registered and certified using the State of Maryland's U.S. Green Building Council membership.

4. Provide space allocation for recycling activities in all new building programs.

5. Basic building commissioning is a pre-requisite for LEED™ certification. Please include additional costs for commissioning in all Capital Budget requests for buildings required to be LEED™ certified.

B.3 ATTACHMENTS

Attachment B-a	Directions for Design Consultants
Attachment B-b	Request for Proposals -- Suggested Additions
Attachment B-c	USGBC LEED™ Green Building Rating System Version 2.0

Attachment B-a: DIRECTIONS FOR DESIGN CONSULTANTS

1. The prime design consultant shall designate an individual to serve as the Green Building Coordinator (GBC) for the project. The Coordinator may be a member of the prime firm, a consulting individual, or a firm licensed to practice architecture or engineering in the State of Maryland. The GBC shall be responsible for facilitating and coordinating all related Green Building activities and shall have either performed previous LEED™ System certifications or shall adequately demonstrate the knowledge necessary to perform the work necessary to obtain a LEED™ Certification. The GBC must be approved by the State during the A/E selection process.

2. The design of all projects required to be LEED™ certified shall employ an integrated design approach. Prior to the start of design, the design consultant's Green Building Coordinator shall conduct a Green Building pre-design meeting with all consultant team members, the State project manager and members of the using agency team to establish the direction and scope of Green Building principles, including construction and maintenance procedures, to be employed in this project to attain the LEED™ Silver rating. These principles shall be recorded in writing as the "Green Building Plan" (GBP). The Green Building Plan shall be updated and submitted for review at each design phase to track any changes, modifications or additions. The A/E shall provide 3 copies of the GBP at the conclusion of the project. One copy for the project file, one copy to the building user and one copy to the Maryland Green Building Council. The GBP shall include two sections. The narrative first section shall follow the format of the LEED™ Green Building Rating System. All official LEED™ interpretations shall be included in this section. The second section shall include the Life Cycle Cost Analysis described in item 4 below.

3. The A/E shall develop and provide a "Green Building Operations and Maintenance Manual" outlining operation and maintenance procedures and schedules for all materials and systems which contribute to the LEED™ Silver rating. This manual is in addition to the usual submission of operating and maintenance manuals and shall focus on system maintenance required to keep green features operating as intended. The intent is to provide system maintenance guidelines as opposed to procedures for maintaining individual pieces of equipment as provided in the equipment operating and maintenance manuals. The manual shall be submitted at the 50% CD phase for review, at the 100% CD submission and after project completion. Refer to Item 10 below for more information on this manual.

4. The consultant shall include as a part of all Green Building Plan submissions, a Life Cycle Cost Analysis which describes costs, both adds and deducts, which are attributed to achieving the LEED™ Silver rating as well as future energy savings attributed to the use of these materials and systems. For example, identify the additional cost attributed to using more expensive efficient glazing and identify the savings attributed to smaller HVAC units made possible by using the more efficient glazing. Identify projected savings in energy usage and costs to be realized due to this strategy. Future repair, maintenance, and replacement costs shall be included as well. Required energy modeling studies shall be included in this section.

5. All projects required to be LEED™ Silver rated shall be commissioned. The State shall employ, from the start of design, an approved commissioning agent to monitor and verify the design, construction and operation of mechanical, electrical, and plumbing systems. The design consultant shall cooperate as needed with the commissioning agent.

6. The design consultant shall identify and bring to the attention of the State Project Manager in writing any conflicts between Green Building requirements and other requirements of the State or the project program.

7. The design consultant's Green Building Coordinator shall develop and submit all documentation necessary to the U.S. Green Building Council's LEED™ Program for certification of the project for the LEED™ Silver or higher rating. Typically, the project shall be registered with LEED™ at the start of design. The final LEED™ certification documentation is submitted after completion of construction. The cost of registering the project with LEED™ as well as a reasonable cost for LEED™ interpretations and consultation shall be included in the consultant's price proposal. All projects shall be registered under the State of Maryland's US Green Building Council membership. A copy of the complete LEED™ submission package shall be submitted to the Maryland Green Buildings Council.

8. The design consultant shall provide a specification section which calls attention to special construction issues related to Green Buildings and the LEED™ rating such as construction materials, construction recycling, special demolition considerations, and potential special construction sequencing issues. This section is in addition to the standard specification sections and is intended to clearly call these special issues to the attention of the contractor during the bidding phase.

9. Reporting

A. For projects which are required to be LEED™ Silver certified, the A/E shall submit one final copy of the LEED™ Certification Submission, stamped and signed with A/E's license stamp, the official LEED™ Certificate, the final Green Building Plan and the Green Building Operations and Maintenance Manual to:

Maryland Green Buildings Council
c/o Department of General Services - Office of the Secretary
301 West Preston Street, Room 1401
Baltimore, Maryland 21201

B. For projects which are not required to be LEED™ Silver certified, the A/E shall submit a narrative report describing the green elements of the projects. Using the LEED™ score sheet, the A/E shall provide a brief description for each available credit describing how that credit was addressed or an explanation of why it was not addressed. The narrative shall be submitted to the project manager and one copy shall be sent to the address listed above.

10. The Green Building Coordinator shall review the project and develop the Green Building Operation and Maintenance Manual based on the green features and operations of each particular building. The manual shall be submitted in addition to the usual Operations and Maintenance Manuals (O&M) typically provided. It should not include maintenance of equipment (pumps for example), which are a part of a "Green Building" system. That information should be provided in the typical O&M manual. In other words, a comprehensive manual of any and all recommendations for maintenance and operations with the specific goal of maintaining green and energy efficient building operations for the life of the building. Examples of the types of information to be provided include, but are not limited to, the following:

A. recommendations on periodic duct inspection or cleaning as well as HVAC filter changes to maintain indoor air quality (IAQ).
B. recommended cleaning materials and cleaning schedules for finishes (especially for "green materials") considering IAQ and extending the life of the material (if the material lasts longer, it doesn't have to be replaced or put in a landfill).

C. information on minimum paint reflectance for repainting interior areas using reflected day lighting.
D. a list of the low VOC paint products and colors used.
E. schedule recommendations for cleaning of glass and light shelves to maintain reflectance and light transmission for daylighting systems.
F. operation recommendations for HVAC systems (these should be available from the commissioning report)
G. a schedule for inspecting and cleaning walk-off mat recesses to maintain IAQ.
H. recommendations for eco-friendly pest control
I. maintenance recommendations for "living roof" plantings.
J. provide a list of local sources for recycling used material such as carpet, ceiling panels and drywall.
K. provide a list of the recyclable materials used in the building.
L. provide a list of the manufacturers and suppliers of green materials used in the building.
M. provide a list of proper lamps (high efficiency/ long life light bulbs) for replacement.
N. provide a list of sources of recycled paper products (toilet paper and paper towels) and eco friendly cleaning products.
O. provide a simple list of instructions for building occupants emphasizing the use of the building's green features such as the purpose of walk-off mats and how to use composting toilets as well as simple instructions such as turning out lights, locations of recycling stations, use of individual HVAC controls, water use reduction methods and other green practices.

Schedule items might be organized in a one year calendar format. This information can be collected as the project progresses with the hope of simplifying the effort at the end of the project. The manual shall be prepared in a 3 ring binder format to allow for convenient reproduction.

Attachment B-b: REQUEST FOR PROPOSALS -- SUGGESTED ADDITIONS

The following items are suggested as additions to Requests for Proposals for Architectural and Engineering (A/E) Services for Green Building projects and for projects which are not required to be LEED™ Silver certified. Items should be edited as needed for each specific project.

1. Green Building Projects required to be LEED™ Silver certified.

A. On March 13, 2001, The Green Power and Energy Efficient Executive Order was signed by Governor Parris N. Glendening establishing the Maryland Green Buildings Council. The Council, in turn, established the High Efficiency Green Building Program. The Program requires that eligible buildings constructed by the State shall meet minimum standards of efficiency based on the United States Green Building Council's Leadership in Energy and Environmental Design (LEED™) Green Building Rating System.

B. This project shall be required to be LEED™ Silver (or higher, if desired by Using Agency) certified.

C. Refer to Attachment B-a of the Maryland Green Building Council's High Efficiency Green Building Program for requirements.

D. Submitters shall provide with their proposal the name of the Green Building Coordinator as required by the High Efficiency Green Building Program. The Green Building Coordinator may be a member of the A/E firm or a consulting individual or firm licensed as an architect or engineer in the State of Maryland. Submit a complete resume describing specific experience and qualifications that will demonstrate the ability to perform the work specified as Green Building Coordinator. Provide descriptions of recent and relative experience in directing environmentally responsible design and construction. Provide a list of projects on which this individual has performed a similar role. State whether the prime A/E firm has worked with this consultant previously.

E. Provide descriptions of recent and relative experience by the prime A/E firm as well as the mechanical, electrical and site design consultants in providing design services for environmentally responsible building projects. Provide a list of built and unbuilt projects on which these firms have special related experience.

F. The qualified firm shall include with their Price Proposal an itemized listing of all costs associated with the design and certification of this project as a LEED™ Green Building. These costs shall include, but shall not be limited to, professional fees of the Green Building Coordinator, additional design costs (provide justification) which may be attributed to designing a green building, LEED™ Certification Registration and Documentation, and reimbursable expenses for reproduction of related materials and reports.

2. Projects Which Are Not Required to be LEED™ Silver Certified.

A. On March 13, 2001, The Green Power and Energy Efficient Executive Order was signed by Governor Parris N. Glendening establishing the Maryland Green

Building Council. The Council, in turn, established the High Efficiency Green Building Program. The Program requires that certain buildings constructed by the State shall meet minimum standards of efficiency based on the United States Green Building Council's Leadership in Energy and Environmental Design (LEED™) Green Building Rating System's Silver certification.

B. This project, in accordance with the Maryland Green Building Council's High Efficiency Green Building Program is not required to be Silver certified by the LEED™ system. However, all State projects are encouraged to use Green Building principles in their design with the Silver rating as a goal. The Green Building Program does require project teams for all projects which are not required to be LEED™ Silver certified to report their efforts to the Maryland Green Buildings Council as follows:

For projects which are not required to be LEED™ Silver certified, the A/E shall submit a narrative report describing the "green" elements of the projects. Using the LEED™ score sheet, the A/E shall provide a brief description for each available credit describing how that credit was addressed or an explanation of why it was not addressed. The narrative shall be submitted to the project manager and one copy shall be sent to the Maryland Green Building Council at the following address:

Maryland Green Buildings Council
c/o Department of General Services - Office of the Secretary
301 West Preston Street, Room 1401
Baltimore, MD 21201

C. Proposers are encouraged to submit a brief description in their proposal of their firm's previous experience in the design of Green Buildings, as well as their intentions for pursuing the stated goal for this project for consideration by the qualification committee.

D. The qualified proposer shall provide a breakdown of the costs associated with this report in their price proposal.

LEED™

LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

Rating System

Version 2.0

Including the Project Checklist

June 2001

Disclaimer

The LEED™ Green Building Rating System 2.0 was developed by the U.S. Green Building Council, under contract number DE-FG36-97GO10268, for the U.S. Department of Energy, Energy Efficiency and Renewable Energy, Office of Building Technology, State, and Community Programs, and are intended for use by commercial building project stakeholders or project team members as a guide for green and sustainable design. They were prepared with the assistance and participation of representatives from many organizations. The views and opinions expressed represent general consensus and available information, but unanimous approval by all organizations is not implied. The views and opinions expressed also do not necessarily state or reflect those of the United States government.

Together, the LEED™ documents represent the U.S. Green Building Council's efforts to develop a standard that improves environmental and economic performance of commercial buildings using established and/or advanced industry principles, practices, materials and standards. They are subject to change from time to time in the future.

The U.S. Green Building Council authorizes you to view the LEED™ Green Building Rating System 2.0 for your individual use. In exchange for this authorization, you agree to retain all copyright and other proprietary notices contained in the original LEED™ Green Building Rating System 2.0. You also agree not to sell or modify the LEED™ Green Building Rating System 2.0 or to reproduce, display or distribute the LEED™ Green Building Rating System 2.0 in any way for any public or commercial purpose, including display on a web site or in a networked environment. Unauthorized use of the LEED™ Green Building Rating System 2.0 violates copyright, trademark, and other laws and is prohibited. All text, graphics, layout, and other elements of content contained in the LEED™ Green Building Rating System 2.0 are owned by the U.S. Green Building Council and are protected by copyright under both United States and foreign laws.

Also please note that none of the parties involved in the funding or creation of the LEED™ Green Building Rating System 2.0, including the U.S. Green Building Council, its members or the United States government make any warranty (express or implied) or assume any liability or responsibility, to you or any third parties for the accuracy, completeness or use of, or reliance on, any information contained in the LEED™ Green Building Rating System 2.0, or for any injuries, losses or damages (including, without limitation, equitable relief) arising out of such use or reliance.

As a condition of use, you covenant not to sue, and agree to waive and release the U.S. Green Building Council, its members and the United States government from any and all claims, demands and causes of action for any injuries, losses or damages (including, without limitation, equitable relief) that you may now or hereafter have a right to assert against such parties as a result of your use of, or reliance on, the LEED™ Green Building Rating System 2.0.

Copyright

Trademark

LEED™ is a registered trademark of the U.S. Green Building Council.

Table of Contents

Project Checklist

Sustainable Sites

14 Possible Points

Y			Prereq 1	**Erosion & Sedimentation Control**	Required
Y	?	N	Credit 1	**Site Selection**	1
Y	?	N	Credit 2	**Urban Redevelopment**	1
Y	?	N	Credit 3	**Brownfield Redevelopment**	1
Y	?	N	Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
Y	?	N	Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
Y	?	N	Credit 4.3	**Alternative Transportation**, Alternative Fuel Refueling Stations	1
Y	?	N	Credit 4.4	**Alternative Transportation**, Parking Capacity	1
Y	?	N	Credit 5.1	**Reduced Site Disturbance**, Protect or Restore Open Space	1
Y	?	N	Credit 5.2	**Reduced Site Disturbance**, Development Footprint	1
Y	?	N	Credit 6.1	**Stormwater Management**, Rate or Quantity	1
Y	?	N	Credit 6.2	**Stormwater Management**, Treatment	1
Y	?	N	Credit 7.1	**Landscape & Exterior Design to Reduce Heat Islands**, NonRoof	1
Y	?	N	Credit 7.2	**Landscape & Exterior Design to Reduce Heat Islands**, Roof	1
Y	?	N	Credit 8	**Light Pollution Reduction**	1

Water Efficiency

5 Possible Points

Y	?	N	Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
Y	?	N	Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
Y	?	N	Credit 2	**Innovative Wastewater Technologies**	1
Y	?	N	Credit 3.1	**Water Use Reduction**, 20% Reduction	1
Y	?	N	Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Energy & Atmosphere

17 Possible Points

Y			Prereq 1	**Fundamental Building Systems Commissioning**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**CFC Reduction in HVAC&R Equipment**	Required
Y	?	N	Credit 1.1	**Optimize Energy Performance**, 20% New / 10% Existing	2
Y	?	N	Credit 1.2	**Optimize Energy Performance**, 30% New / 20% Existing	2
Y	?	N	Credit 1.3	**Optimize Energy Performance**, 40% New / 30% Existing	2
Y	?	N	Credit 1.4	**Optimize Energy Performance**, 50% New / 40% Existing	2
Y	?	N	Credit 1.5	**Optimize Energy Performance**, 60% New / 50% Existing	2
Y	?	N	Credit 2.1	**Renewable Energy**, 5%	1
Y	?	N	Credit 2.2	**Renewable Energy**, 10%	1
Y	?	N	Credit 2.3	**Renewable Energy**, 20%	1
Y	?	N	Credit 3	**Additional Commissioning**	1
Y	?	N	Credit 4	**Ozone Depletion**	1
Y	?	N	Credit 5	**Measurement & Verification**	1
Y	?	N	Credit 6	**Green Power**	1

Materials & Resources

13 Possible Points

Y			Prereq 1	**Storage & Collection of Recyclables**	Required
Y	?	N	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Shell	1
Y	?	N	Credit 1.2	**Building Reuse**, Maintain 100% of Shell	1
Y	?	N	Credit 1.3	**Building Reuse**, Maintain 100% Shell & 50% Non-Shell	1
Y	?	N	Credit 2.1	**Construction Waste Management**, Divert 50%	1
Y	?	N	Credit 2.2	**Construction Waste Management**, Divert 75%	1
Y	?	N	Credit 3.1	**Resource Reuse**, Specify 5%	1
Y	?	N	Credit 3.2	**Resource Reuse**, Specify 10%	1
Y	?	N	Credit 4.1	**Recycled Content**, Specify 25%	1
Y	?	N	Credit 4.2	**Recycled Content**, Specify 50%	1
Y	?	N	Credit 5.1	**Local/Regional Materials**, 20% Manufactured Locally	1
Y	?	N	Credit 5.2	**Local/Regional Materials**, of 20% Above, 50% Harvested Locally	1
Y	?	N	Credit 6	**Rapidly Renewable Materials**	1
Y	?	N	Credit 7	**Certified Wood**	1

Indoor Environmental Quality

15 Possible Points

Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
Y	?	N	Credit 1	**Carbon Dioxide** (CO_2) **Monitoring**	1
Y	?	N	Credit 2	**Increase Ventilation Effectiveness**	1
Y	?	N	Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
Y	?	N	Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
Y	?	N	Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
Y	?	N	Credit 4.2	**Low-Emitting Materials**, Paints	1
Y	?	N	Credit 4.3	**Low-Emitting Materials**, Carpet	1
Y	?	N	Credit 4.4	**Low-Emitting Materials**, Composite Wood	1
Y	?	N	Credit 5	**Indoor Chemical & Pollutant Source Control**	1
Y	?	N	Credit 6.1	**Controllability of Systems**, Perimeter	1
Y	?	N	Credit 6.2	**Controllability of Systems**, Non-Perimeter	1
Y	?	N	Credit 7.1	**Thermal Comfort**, Comply with ASHRAE 55-1992	1
Y	?	N	Credit 7.2	**Thermal Comfort**, Permanent Monitoring System	1
Y	?	N	Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
Y	?	N	Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Innovation & Design Process

5 Possible Points

Y	?	N	Credit 1.1	**Innovation in Design**: Specific Title	1
Y	?	N	Credit 1.2	**Innovation in Design**: Specific Title	1
Y	?	N	Credit 1.3	**Innovation in Design**: Specific Title	1
Y	?	N	Credit 1.4	**Innovation in Design**: Specific Title	1
Y	?	N	Credit 2	**LEED™ Accredited Professional**	1

Project Totals

69 Possible Points

☐ ☐ ☐ **Certified** 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

Sustainable Sites

SS | WE | EA | MR | EQ | ID
Prerequisite 1

Prerequisite 1 **Erosion & Sedimentation Control** Required

Intent

Control erosion to reduce negative impacts on water and air quality.

Requirement

Prerequisite 1.0 Design to a site sediment and erosion control plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities, EPA Document No. EPA-832-R-92-005, Chapter 3, OR local Erosion and Sedimentation Control standards and codes, whichever is more stringent. The plan shall meet the following objectives:

- Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.

- Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter.

Technologies & Strategies

Adopt an erosion and sedimentation control plan for the project site during construction. Consider employing strategies such as temporary and permanent seeding, mulching, earth dikes, silt fencing, sediment traps, and sediment basins.

1 Point

Credit 1 **Site Selection**

Intent

Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

Requirement

Credit 1.0 (1 point) Do not develop buildings on portions of sites that meet any one of the following criteria:

-Prime farmland as defined by the American Farmland Trust

-Land whose elevation is lower than **5 feet above** the elevation of the 100-year flood as defined by FEMA

-Land which provides habitat for any species on the Federal or State threatened or endangered list

-Within **100 feet** of any wetland as defined by 40 CFR, Parts 230-233 and Part 22, OR as defined by local or state rule or law, whichever is more stringent

-Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner (Park Authority projects are exempt)

Technologies & Strategies

During the site selection process, give preference to those sites that do not include sensitive site elements and restricted land types. Select a suitable building location and design the building with the minimal footprint to minimize site disruption. Strategies include stacking the building program, tuck under parking, and sharing facilities with neighbors.

Credit 2 **Urban Redevelopment** 1 Point

Intent

Channel development to urban areas with existing infrastructures, protecting greenfields and preserving habitat and natural resources.

Requirement

Credit 2.0 (1 point) Increase localized density to conform to existing or desired density goals by utilizing sites that are located within an existing minimum development density of **60,000 square feet per acre** (2 story downtown development)

Technologies & Strategies

During the site selection process, give preference to urban sites with high development densities. Quantify the development density of the project as well as the surrounding area.

1 Point

Credit 3 **Brownfield Redevelopment**

Intent

Rehabilitate damaged sites where development is complicated by real or perceived environmental contamination, reducing pressure on undeveloped land.

Requirement

Credit 3.0 (1 Point) Develop on a site classified as a Brownfield and provide remediation as required by EPA's Sustainable Redevelopment of Brownfields Program requirements

Technologies & Strategies

During the site selection process, give preference to brownfield sites. Identify tax incentives and property cost savings by selecting a brownfield site. Adopt a site remediation plan and cleanup the site using remediation strategies such as pump-and-treat, bioreactors, land farming, and in-situ remediation.

Credit 4 **Alternative Transportation** 1-4 Points

Intent

Reduce pollution and land development impacts from automobile use.

Requirements

Credit 4.1 (1 point) Locate building within **½ mile** of a commuter rail, light rail or subway station or **¼ mile** of 2 or more bus lines

Credit 4.2 (1 point) Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for **5%** or more of building occupants

Credit 4.3 (1 point) Install alternative-fuel refueling station(s) for **3%** of the total vehicle parking capacity of the site. Liquid or gaseous fueling facilities must be separately ventilated or located outdoors

Credit 4.4 (1 point) Size parking capacity not to exceed minimum local zoning requirements AND provide preferred parking for carpools or van pools capable of serving **5%** of the building occupants, OR, add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving **5%** of the building occupants.

Technologies & Strategies

Perform a transportation survey of future building occupants to identify transportation needs. Site the building near mass transit and design the building with transportation amenities such as bicycle racks and showering/changing facilities, alternative fuel refueling stations, and carpool/ van pool programs. Also consider sharing transportation facilities such as parking lots and refueling stations with neighbors.

1-2 Points

Credit 5 **Reduced Site Disturbance**

Intent

Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirements

Credit 5.1 (1 point) On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to **40 feet** beyond the building perimeter, **5 feet** beyond primary roadway curbs, walkways, and main utility branch trenches, and **25 feet** beyond pervious paving areas that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of **50%** of the remaining open area by planting native or adapted vegetation.

Credit 5.2 (1 point) Reduce the development footprint (including building, access roads and parking) to exceed the local zoning's open space requirement for the site by **25%**.

Technologies & Strategies

Perform a site survey to identify site elements and adopt a master plan for development of the project site. Select a suitable building location and design the building with the minimal footprint to minimize site disruption. Strategies include stacking the building program, tuck under parking, and sharing facilities with neighbors. Establish clearly marked construction boundaries to minimize disturbance of existing site and restore previously degraded areas to their natural state.

Credit 6 **Stormwater Management** 1-2 Points

Intent

Limit disruption of natural water flows by minimizing stormwater runoff, increasing on-site infiltration and reducing contaminants.

Requirements

Implement a stormwater management plan that results in:

Credit 6.1 (1 point) **No net increase** in the rate and quantity of stormwater runoff from existing to developed conditions; OR, if existing imperviousness is greater than **50%**, implement a stormwater management plan that results in a **25%** decrease in the rate and quantity of stormwater runoff.

Credit 6.2 (1 point) Treatment systems designed to remove **80%** of the average annual post development total suspended solids (TSS), and **40%** of the average annual post development total phosphorous (TP), by implementing Best Management Practices (BMPs) outlined in EPA's Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters (EPA 840-B-92-002 1/93).

Technologies & Strategies

Design the project site to maintain natural stormwater flows by promoting infiltration. Specify garden roofs and pervious paving to minimize impervious surfaces. Reuse stormwater volumes generated for non-potable uses such as landscape irrigation, toilet and urinal flushing, and custodial uses. Install mechanical or natural treatment systems such as constructed wetlands, vegetated filter strips, and bioswales to treat stormwater volumes leaving the site.

1-2 Points

Credit 7 **Landscape and Exterior Design to Reduce Heat Islands**

Intent

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirements

Credit 7.1 (1 point) Provide shade (within 5 years) on at least **30%** of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored/high-albedo materials (reflectance of at least 0.3) for **30%** of the site's non-roof impervious surfaces, OR place a minimum of **50%** of parking space underground OR use open-grid pavement system (net impervious area of LESS than 50%) for a minimum of **50%** of the parking lot area.

Credit 7.2 (1 point) Use ENERGY STAR Roof-compliant, high-reflectance AND high emissivity roofing (initial reflectance of at least 0.65 and three-year-aged reflectance of **at least 0.5** when tested in accordance with ASTM E903 and emissivity of **at least 0.9** when tested in accordance with ASTM 408) for a minimum of **75%** of the roof surface; OR, install a "green" (vegetated) roof for at least **50%** of the roof area.

Technologies & Strategies

Shade constructed surfaces on the site with landscape features and minimize the overall building footprint. Consider replacing constructed surfaces (i.e., roof, roads, sidewalks, etc.) with vegetated surfaces such as garden roofs and open grid paving or specify light-colored, high-albedo materials to reduce the heat absorption.

Credit 8 **Light Pollution Reduction** 1 Point

Intent

Eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environments.

Requirement

Credit 8.0 (1 point) Do not exceed Illuminating Engineering Society of North America (IESNA) footcandle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments, AND design interior and exterior lighting such that zero direct-beam illumination leaves the building site.

Technologies & Strategies

Adopt site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution. Minimize site lighting where possible and model the site lighting using a computer model. Technologies to reduce light pollution include full cutoff luminaries, low-reflectance surfaces, and low-angle spotlights.

SS **WE** EA MR EQ ID

Credit 1

Water Efficiency

1-2 Points

Credit 1 **Water Efficient Landscaping**

Intent

Limit or eliminate the use of potable water for landscape irrigation.

Requirements

Credit 1.1 (1 point) Use high efficiency irrigation technology, OR, use captured rain or recycled site water, to reduce potable water consumption for irrigation by **50%** over conventional means.

Credit 1.2 (1 point) Use only captured rain or recycled site water for an additional **50%** reduction (**100% total reduction**) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems.

Technologies & Strategies

Perform a soil/climate analysis to determine appropriate landscape types and design the landscape with indigenous plants to reduce or eliminate irrigation requirements. Use high efficiency irrigation systems and consider reuse of stormwater or graywater volumes for irrigation.

Credit 2 **Innovative Wastewater Technologies** 1 Point

Intent

Reduce the generation of wastewater and potable water demand, while increasing the local aquifer recharge.

Requirement

Credit 2.0 (1 point) Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of **50%**, OR, treat **100%** of wastewater on site to tertiary standards.

Technologies & Strategies

Estimate the wastewater volumes generated in the building and specify high efficiency fixtures and dry fixtures such as composting toilets and waterless urinals to reduce these volumes. Consider reusing stormwater or graywater for sewage conveyance or on-site wastewater treatment systems (mechanical or natural).

1-2 Points

Credit 3 **Water Use Reduction**

Intent

Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirement & Submittals

Credit 3.1 (1 point) Employ strategies that in aggregate use **20%** less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.

Credit 3.2 (1 point) Exceed the potable water use reduction by an additional **10%** (**30%** total efficiency increase).

Technologies & Strategies

Estimate the potable and non-potable water needs for the building. Use high efficiency fixtures, dry fixtures such as composting toilets and waterless urinals, and occupant sensors to reduce the potable water demand. Consider reuse of stormwater and graywater for non-potable applications such as toilet and urinal flushing, mechanical systems, and custodial uses.

Energy & Atmosphere

SS | WE | **EA** | MR | EQ | ID

Prerequisite 1

Prerequisite 1 **Fundamental Building Systems Commissioning** Required

Intent

Verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended.

Requirement

Prerequisite 1.0 Implement the following fundamental best practice commissioning procedures:

-Engage a commissioning authority

-Review design intent and basis of design documentation

-Include commissioning requirements in the construction documents

-Develop and utilize a commissioning plan

-Verify installation, functional performance, training and documentation

-Complete a commissioning report

Technologies & Strategies

Engage a commissioning authority and adopt a commissioning plan. Include commissioning requirements in bid documents and task the commissioning agent to produce a commissioning report once commissioning activities are completed.

Required

Prerequisite 2 **Minimum Energy Performance**

Intent

Establish the minimum level of energy efficiency for the base building and systems.

Requirement

Prerequisite 2.0 Design to meet building energy efficiency and performance as required by ASHRAE/IESNA 90.1-1999 or the local energy code, whichever is the more stringent.

Technologies & Strategies

Design the building envelope and building systems to maximize energy performance. Use a computer simulation model to assess the energy performance and identify the most cost effective energy efficiency measures. Quantify energy performance as compared to a baseline building.

Prerequisite 3 **CFC Reduction in HVAC&R Equipment** Required

Intent

Reduce ozone depletion.

Requirement

Prerequisite 3.0 **Zero use** of CFC-based refrigerants in new building HVAC&R base building systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phaseout conversion.

Technologies & Strategies

When reusing existing HVAC systems, conduct an inventory to identify equipment that uses CFC refrigerants and adopt a replacement schedule for these refrigerants. For new buildings, specify new HVAC equipment that uses no CFC refrigerants.

2-10 Points

Credit 1 **Optimize Energy Performance**

Intent

Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Requirements

Reduce design energy cost compared to the energy cost budget for regulated energy components described in the requirements of ASHRAE/IESNA Standard 90.1-1999, as demonstrated by a whole building simulation using the Energy Cost Budget Method described in Section 11:

New Buildings	Existing Buildings	Points
20%	**10%**	2
30%	**20%**	4
40%	**30%**	6
50%	**40%**	8
60%	**50%**	10

Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE.

Credit 1.1 (2 points) Reduce design energy cost by **20%** / **10%**.
Credit 1.2 (4 points) Reduce design energy cost by **30%** / **20%**.
Credit 1.3 (6 points) Reduce design energy cost by **40%** / **30%**.
Credit 1.4 (8 points) Reduce design energy cost by **50%** / **40%**.
Credit 1.5 (10 points) Reduce design energy cost by **60%** / **50%**.

Technologies & Strategies

Design the building envelope and building systems to maximize energy performance. Use a computer simulation model to assess the energy performance and identify the most cost effective energy efficiency measures. Quantify energy performance as compared to a baseline building.

Credit 2 **Renewable Energy** 1-3 Points

Intent

Encourage and recognize increasing levels of self-supply through renewable technologies to reduce environmental impacts associated with fossil fuel energy use.

Requirements

Supply a net fraction of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.

% Total Energy Load Cost in Renewables	Points
5%	1
10%	2
20%	3

Credit 2.1 (1 points) Renewable energy, **5%** contribution

Credit 2.2 (2 points) Renewable energy, **10%** contribution

Credit 2.3 (3 points) Renewable energy, **20%** contribution

Technologies & Strategies

Assess the project for renewable energy potential including solar, wind, geothermal, biomass, hydro, and bio-gas strategies. When applying these strategies, take advantage of net metering with the local utility.

1 Point

Credit 3 **Additional Commissioning**

Intent

Verify and ensure that the entire building is designed, constructed, and calibrated to operate as intended.

Requirement

Credit 3.0 (1 point) In addition to the Fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks:

1. Conduct a focused review of the design prior to the construction documents phase.

2. Conduct a focused review of the Construction Documents when close to completion.

3. Conduct a selective review of contractor submittals of commissioned equipment. (The above three reviews must be performed by a firm other than the designer.)

4. Develop a recommissioning management manual.

5. Have a contract in place for a near-warranty end or post occupancy review.

Technologies & Strategies

Engage the Commissioning Authority early in project design phases. Task the commissioning agent to conduct project reviews before and after construction documents are complete. The Commissioning Agent must also create a recommissioning manual for the building and review the project at near-warranty end.

Credit 4 **Ozone Depletion** 1 Point

Intent

Reduce ozone depletion and support early compliance with the Montreal Protocol.

Requirement

Credit 4.0 (1 point) Install base building level HVAC and refrigeration equipment and fire suppression systems that do not contain HCFC's or Halon.

Technologies & Strategies

When reusing buildings, inventory existing building systems using refrigerants and fire suppression chemicals and replace those that contain HCFCs or halons. For new buildings, specify refrigeration and fire suppression systems that use no HCFCs or halons.

1 Point

Credit 5 **Measurement & Verification**

Intent

Provide for the ongoing accountability and optimization of building energy and water consumption performance over time.

Requirement

Credit 5.0 (1 point) Comply with the long term continuous measurement of performance as stated in Option B: Methods by Technology of the US DOE's International Performance Measurement and Verification Protocol (IPMVP) for the following:

-Lighting systems and controls

-Constant and variable motor loads

-Variable frequency drive (VFD) operation

-Chiller efficiency at variable loads (kW/ton)

-Cooling load

-Air and water economizer and heat recovery cycles

-Air distribution static pressures and ventilation air volumes

-Boiler efficiencies

-Building specific process energy efficiency systems and equipment

-Indoor water risers and outdoor irrigation systems

Technologies & Strategies

Model the energy and water systems to predict savings. Design the building with equipment to measure energy and water performance. Draft a Measurement & Verification Plan to apply during building operation that compares predicted savings to those actually achieved in the field.

Credit 6 **Green Power** 1 Point

Intent

Encourage the development and use of grid-source energy technologies on a net zero pollution basis.

Requirement

Credit 6.0 (1 point) Engage in a two year contract to purchase power generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-e products certification requirements.

Technologies & Strategies

Estimate the energy needs of the building and investigate opportunities to engage in a green power contract with the local utility. Green power is derived from solar, wind, geothermal, biomass, or low-impact hydro sources.

Materials & Resources

Required

Prerequisite 1 **Storage & Collection of Recyclables**

Intent

Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Requirement

Prerequisite 1.0 Provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals.

Technologies & Strategies

Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area. Identify local waste handlers and buyers for glass, plastic, office paper, newspaper, cardboard, and organic wastes. Instruct occupants on building recycling procedures. Consider employing cardboard balers, aluminum can crushers, recycling chutes, and other waste management technologies to further enhance the recycling program.

Credit 1 **Building Reuse** 1-3 Points

Intent

Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirements

Reuse large portions of existing structures during renovation or redevelopment projects:

Credit 1.1 (1 point) Maintain at least **75%** of existing building structure and shell (exterior skin and framing excluding window assemblies)

Credit 1.2 (1 point) Maintain an additional **25%** (**100%** total) of existing building structure and shell (exterior skin and framing excluding window assemblies)

Credit 1.3 (1 point) Maintain **100%** of existing building structure and shell AND **50%** non-shell (walls, floor coverings, and ceiling systems)

Technologies & Strategies

Consider reuse of existing buildings, including structure, shell, and non-shell elements. Remove elements that pose contamination risk to building occupants and upgrade outdated components such as windows, mechanical systems, and plumbing fixtures. Quantify the extent of building reuse.

1-2 Points

Credit 2 **Construction Waste Management**

Intent

Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process.

Requirements

Develop and implement a waste management plan, quantifying material diversion by weight. (Remember that salvage may include the donation of materials to charitable organizations such as Habitat for Humanity.)

Credit 2.1 (1 point) Recycle and/or salvage at least **50%** (by weight) of construction, demolition, and land clearing waste

Credit 2.2 (1 point) Recycle and/or salvage an additional **25%** (**75%** total by weight) of the construction, demolition, and land clearing debris

Technologies & Strategies

Establish goals for landfill diversion and adopt a construction waste management plan to achieve these goals. Consider recycling land clearing debris, cardboard, metals, brick, concrete, plastic, clean wood, glass, gypsum wallboard, carpet, and insulation. Designate a specific area on the construction site for recycling and track recycling efforts throughout the construction process. Identify construction haulers and recyclers to handle the designated materials.

Credit 3 **Resource Reuse** 1-2 Points

Intent

Extend the life cycle of targeted building materials by reducing environmental impacts related to materials manufacturing and transport.

Requirements

Credit 3.1 (1 point) Specify salvaged or refurbished materials for **5%** of building materials

Credit 3.2 (1 point) Specify salvaged or refurbished materials for **10%** of building materials

Technologies & Strategies

Identify opportunities to incorporate salvage materials into the building design and research potential material suppliers. Consider salvage materials such as beams and posts, flooring, paneling, doors and frames, cabinetry and furniture, brick, and decorative items.

1-2 Points

Credit 4 **Recycled Content**

Intent

Increase demand for building products that have incorporated recycled content materials, therefore reducing the impacts resulting from the extraction of new materials.

Requirements

Credit 4.1 (1 point) Specify a minimum of **25%** of building materials that contain in aggregate, a minimum weighted average of **20%** post-consumer recycled content material, OR, a minimum weighted average **40%** post-industrial recycled content material.

Credit 4.2 (1 point) Specify an additional **25%** (**50%** total) of building materials that contain in aggregate, a minimum weighted average of **20%** post-consumer recycled content material, OR, a minimum weighted average of **40%** post-industrial recycled content material.

Technologies & Strategies

Establish a project goal for recycled content materials and identify materials and material suppliers that can achieve this goal. During construction, ensure that the specified recycled content materials are installed and quantify the total percentage of recycled content materials installed.

Credit 5 **Local/Regional Materials** 1-2 Points

Intent

Increase demand for building products that are manufactured locally, thereby reducing the environmental impacts resulting from their transportation and supporting the local economy.

Requirements

Credit 5.1 (1 point) Specify a minimum of **20%** of building materials that are manufactured* regionally within a radius of 500 miles.

Credit 5.2 (1 point) Of these regionally manufactured materials, specify a minimum of **50%** that are extracted, harvested, or recovered within 500 miles.

* Manufacturing refers to the *final assembly* of components into the building product that is furnished and installed by the tradesmen. For example, if the hardware comes from Dallas, Texas, the lumber from Vancouver, British Columbia and the joist is assembled in Kent, Washington; then the location of the *final assembly* is Kent, Washington.

Technologies & Strategies

Establish a project goal for locally sourced materials and identify materials and material suppliers that can achieve this goal. During construction, ensure that the specified local materials are installed and quantify the total percentage of local materials installed.

1 Point

Credit 6 **Rapidly Renewable Materials**

Intent

Reduce the use and depletion of finite raw, and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirement

Credit 6.0 (1 point) Specify rapidly renewable building materials for **5%** of total building materials.

Technologies & Strategies

Establish a project goal for rapidly renewable materials and identify materials and suppliers that can achieve this goal. Consider materials such as bamboo flooring, wool carpet, strawboard, cotton batt insulation, linoleum flooring, poplar OSB, sunflower seed board, and wheatgrass cabinetry. During construction, ensure that the specified rapidly renewable materials are installed and quantify the total percentage of rapidly renewable materials installed.

Credit 7 **Certified Wood** 1 Point

Intent

Encourage environmentally responsible forest management.

Requirement

Credit 7.0 (1 point) Use a minimum of **50%** of wood-based materials certified in accordance with the Forest Stewardship Council Guidelines for wood building components including but not limited to structural framing and general dimensional framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers.

Technologies & Strategies

Establish a project goal for FSC-certified wood products and identify products and suppliers that can achieve this goal. During construction, ensure that the FSC-certified wood products are installed and quantify the total percentage of FSC-certified wood products installed.

SS | WE | EA | MR | **EQ** | ID

Prerequisite 1

Indoor Environmental Quality

Required

Prerequisite 1 **Minimum IAQ Performance**

Intent

Establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.

Requirement

Prerequisite 1.0 Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.

Technologies & Strategies

Design the HVAC system to meet the ventilation requirements of the reference standard. Identify potential IAQ problems on the site and locate air intakes away from contaminant sources.

Prerequisite 2 **Environmental Tobacco Smoke** (ETS) **Control**

Required

Intent

Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).

Requirement

Prerequisite 2.0

Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, provide a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETS-containing air to the nonsmoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of **at least 7 Pa** (0.03 inches of water gauge).

Performance of smoking rooms shall be verified using tracer gas testing methods as described in the ASHRAE Standard 129-1997. Acceptable exposure in nonsmoking areas is defined as **less than 1%** of the tracer gas concentration in the smoking room detectable in the adjoining nonsmoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.

Technologies & Strategies

Prohibit smoking in the building or provide separate smoking rooms with isolated ventilation systems.

1 Point

Credit 1 **Carbon Dioxide** (CO_2) **Monitoring**

Intent

Provide capacity for indoor air quality (IAQ) monitoring to sustain long-term occupant health and comfort.

Requirement

Credit 1.0 (1 point) Install a permanent carbon dioxide (CO_2) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time.

Technologies & Strategies

Design the HVAC system with carbon dioxide monitoring sensors and integrate these sensors with the building automation system (BAS).

Credit 2 **Increase Ventilation Effectiveness** 1 Point

Intent

Provide for the effective delivery and mixing of fresh air to support the health, safety, and comfort of building occupants.

Requirement

Credit 2.0 (1 point) For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to **0.9** as determined by ASHRAE 129-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than **90%** of the room or zone area in the direction of air flow for at least **95%** of hours of occupancy.

Technologies & Strategies

Design the HVAC system and building envelope to optimize air change effectiveness. Air change effectiveness can be optimized using a variety of ventilation strategies including displacement ventilation, low-velocity ventilation, plug flow ventilation such as underfloor or near-floor delivery, and operable windows. Test the air change effectiveness of the building after construction.

1-2 Points

Credit 3 **Construction IAQ Management Plan**

Intent

Prevent indoor air quality problems resulting from the construction/renovation process, to sustain long-term installer and occupant health and comfort.

Requirements

Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and preoccupancy phases of the building as follows:

Credit 3.1 (1 point) During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999.

Credit 3.2 (1 point) Conduct a minimum two-week building flush-out with new filtration media at **100%** outside air after construction ends and prior to occupancy, OR conduct a baseline indoor air quality testing procedure consistent with current EPA Protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445.

Technologies & Strategies

Adopt an IAQ management plan to protect the HVAC system during construction, control pollutant sources, and interrupt pathways for contamination. Sequence installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile, and gypsum wallboard. Prior to occupancy, perform a two-week building flushout or test the contaminant levels in the building.

Credit 4 **Low-Emitting Materials** 1-4 Points

Intent

Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.

Requirements

Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:

Credit 4.1 (1 point) Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Quality Management District Reg. 8, Rule 51.

Credit 4.2 (1 point) Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements.

Credit 4.3 (1 point) Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program.

Credit 4.4 (1 point) Composite wood and agrifiber products must contain no added urea-formaldehyde resins.

Technologies & Strategies

Specify low-VOC materials in construction documents. Ensure that VOC limits are clearly stated in each section where adhesives, sealants, paints, coatings, carpet systems, and composite woods are addressed.

1 Point

Credit 5 **Indoor Chemical & Pollutant Source Control**

Intent

Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

Requirement

Credit 5.0 (1 point) Design to minimize cross-contamination of regularly occupied occupancy areas by chemical pollutants: Employ permanent entry way systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entry ways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

Technologies & Strategies

Design separate exhaust and plumbing systems for rooms with contaminants to achieve physical isolation from the rest of the building. Install permanent architectural entryway systems such as grills or grates to prevent occupant-borne contaminants from entering the building.

Credit 6 **Controllability of Systems** 1-2 Points

Intent

Provide a high level of individual occupant control of thermal, ventilation, and lighting systems to support optimum health, productivity, and comfort conditions.

Requirements

Credit 6.1 (1 point) Provide a minimum of **one** operable window and **one** lighting control zone **per 200 SF** for all occupied areas **within 15 feet** of the perimeter wall.

Credit 6.2 (1 point) Provide controls for each individual for airflow, temperature, and lighting for **50%** of the non-perimeter, regularly occupied areas.

Technologies & Strategies

Design the building with occupant controls for airflow, temperature, and lighting. Strategies to consider include task lighting, operable windows, and underfloor HVAC systems with individual diffusers.

1-2 Points

Credit 7 **Thermal Comfort**

Intent

Provide for a thermally comfortable environment that supports the productive and healthy performance of the building occupants.

Requirements

Credit 7.1 (1 point) Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone.

Credit 7.2 (1 point) Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building.

Technologies & Strategies

Establish temperature and humidity comfort ranges and design the building envelope and HVAC system to maintain these comfort ranges. Install and maintain a temperature and humidity monitoring system in the building to automatically adjust building conditions as appropriate.

Credit 8 **Daylight & Views** 1-2 Points

Intent

Provide a connection between indoor spaces and outdoor environments through the introduction of sunlight and views into the occupied areas of the building.

Requirement & Submittals

Credit 8.1 (1 point) Achieve a minimum Daylight Factor of **2%** (excluding all direct sunlight penetration) in **75%** of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight.

Credit 8.2 (1 point) Direct line of sight to vision glazing from **90%** of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas.

Technologies & Strategies

Design the building to maximize daylighting and view opportunities. Strategies to consider include building orientation, shallow floor plates, increased building perimeter, exterior and interior shading devices, high performance glazing, and photo-integrated light sensors. Model daylighting strategies with a physical or computer model to assess footcandle levels and daylight factors achieved.

SS | WE | EA | MR | EQ | **ID**

Credit 1

Innovation & Design Process

1-4 Points

Credit 1 **Innovation in Design**

Intent

To provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by the LEED Green Building Rating System™ and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System™.

Requirements

Credit 1.1 (1 point) In writing, using the LEED™ Credit Equivalence process, identify the **intent** of the proposed innovation credit, the proposed **requirement** for compliance, the proposed **submittals** to demonstrate compliance, and the **design approach** used to meet the required elements.

Credit 1.2 (1 point) Same as Credit 1.1.

Credit 1.3 (1 point) Same as Credit 1.1.

Credit 1.4 (1 point) Same as Credit 1.1.

Technologies & Strategies

Substantially exceed a LEED™ performance credit such as energy performance or water efficiency. Apply strategies or measures that are not covered by LEED™ such as acoustic performance, education of occupants, community development, or life-cycle analysis of material choices.

Credit 2 **LEED™ Accredited Professional** 1 Point

Intent

To support and encourage the design integration required by a LEED™ Green Building project and to streamline the application and certification process.

Requirement

Credit 2.0 (1 point) At least one principal participant of the project team that has successfully completed the LEED™ Accredited Professional exam.

Technologies & Strategies

Attend a LEED™ Accredited Professional Training Workshop and successfully pass the LEED™ accreditation exam.

Appendix C:
Maryland State Agencies' 2000 Recycling Rates

Maryland State Agencies' 2000 Recycling Rates

Agency Name	No. of Sites	No. of People*	Total MRA 1999 (tons)	Total MRA 2000 (tons)	2000 MRA Recycling Rate (%)
Dept. of General Services	16	9,840	396.50	842.44	**38.4**
Injured Workers Insurance Fund	1	380	28.00	28.00	**25.2**
Dept. of Labor, Licensing & Regulation	16	1,233	88.95	69.50	9.7
Dept. of Agriculture	3	261	47.21	47.76	**29.0**
MD Public Broadcasting Commission	1	232	16.36	14.40	17.2
Comptroller of the Treasury	1	940	219.20	233.50	**69.2**
MD School for the Deaf	2	771	48.04	71.44	19.4
Dept. of Natural Resources	7	963	24.07	32.36	**23.9**
Dept. of Juvenile Services	14	2,325	57.39	57.14	4.1
MD State Archives	1	101	4.71	5.21	14.3
Dept. of the Environment	1	900	127.49	105.65	**43.5**
Dept. of Transportation	58	17,776	3,596.06	3321.96	18.3
Dept. of Health and Mental Hygiene	18	9,313	596.51	629.40	13.0
MD General Assembly	1	1,223	156.05	168.19	**28.2**
Dept of Public Safety & Correctional Svcs.	38	35,582	1,231.76	1556.34	5.8
Dept. of Human Resources	15	5,303	31.10	190.52	**20.3**
State Dept. of Assessments and Taxation	4	400	1.96	4.00	11.7
University of Maryland System	14	115,858	3,847.31	4669.85	**20.7**
St. Mary's College of MD	1	1,790	165.05	217.00	**21.6**
Morgan State University	1	7,000	1.77	5.55	0.8
Dept. of Education	1	386	457.76	DNR	DNR
MD Automobile Insurance Fund	1	386	34.31	15.70	13.1
MD Stadium Authority	1	2,100	564.60	609.00	**22.5**
Baltimore City Community College	1	2,300	28.82	15.03	8.7
MD Environmental Service	1	129	9.93	9.93	**38.9**
MD Food Center Authority	1	20	3.03	1.84	**25.6**
Judiciary of MD	1	153	18.2	14.20	**25.8**
Office of the Public Defender	1	150	0.00	0.00	0.0
Subsequent Injury Fund Board	1	18	1.00	1.50	**23.1**
Dept. of Veterans Affairs	5	698	45.53	96.70	17.5
Dept. of Budget and Management	1	300	3.46	DNR	DNR
MD State Police	36	2,169	59.23	287.89	**29.8**
Dept of Business & Economic Development	1	666	21.48	18.87	17.5
MD Higher Education Commission	1	85	1.88	2.60	10.0
Dept of Housing and Comm. Development	1	455	32.96	37.39	**47.3**
TOTALS	**267**	**222,206**	**11,999.69**	**13,380.86**	**15.5**

* State employees comprise approximately 78,399 of the total amount of people at State Agencies.

Appendix D:
All Star News

MDE

All StAR News

Summer, 2001

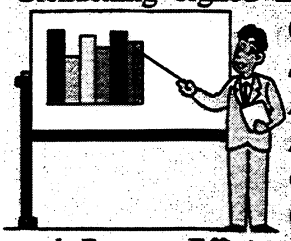
All StAR

All State Agencies Recycle

Improving the All StAR Program

– David Mrgich

On March 13, 2001, Governor Glendening signed Executive Order 01.01.2001.02 *Sustaining Maryland's Future with Clean Power, Green Buildings and Energy Efficiency*. The Order has a pollution prevention goal that requires State agencies to annually divert or recycle at least 20% of the waste they generate beginning on January 1, 2003.



In 2000, State agencies achieved a recycling rate of 15.5%. This marked the third year in a row that the State agency (All StAR) recycling rate has not reached the 20% recycling rate goal of the Maryland Recycling Act. Listed below are the State agencies' 2000 All StAR recycling rates. For a complete breakdown of the All StAR recycling statistics visit the "State Program Info" heading on MDE's recycling webpage.

[*See RATES, page 2*]

RECYCLING CONTACTS

Maryland Department of the Environment
Waste Management Administration
www.mde.state.md.us/was/recycle

Regina Rochez, Program Manager
Planning, Recycling, and Outreach Program
rrochez@mde.state.md.us

Hallie Clemm, Chief
Planning and Recycling Division
hclemm@mde.state.md.us

Virginia Lipscomb, Section Head
State and County Programs
vlipscomb@mde.state.md.us

David M. Mrgich, Recycling Coordinator
dmrgich@mde.state.md.us

MD State Police – Work in Progress

– David Mrgich

Captain Charles H. Mays, Commander of the Facilities Management Division, faced a daunting challenge in 2000. With recycling rates of 4.6%, 5.3%, 7.8%, and 7.4% in 1996, 1997, 1998, and 1999, respectively, the Maryland State Police (MSP) seemed destined for a sub-par repeat in 2000. How would Captain Mays bring the MSP into compliance with the Maryland Recycling Act's 20% recycling goal?

Taking a hands-on approach, Captain Mays sought to maximize his resources. He started by adding 10 sites to the MSP's All StAR reporting list. Then he worked with MSP offices to ensure that the MSP accurately reported their recycling totals and took advantage of all the materials that count towards their recycling rate.

The effect was dramatic. In 2000, the MSP more than quadrupled their recycling tonnage and increased their recycling rate to 29.8%. Way to go MSP and here's to an even better year in 2001!

Video Tape & CD Recycling

– Kelly Schaefer

Ever wonder how you were going to dispose of your old, out-dated videotapes and CDs? There are numerous sites that will accept them for recycling. Simply mail them to:

[*See MEDIA, page 2*]

[RATES, *from page 1*]

Agency	Rate (%)
Automobile Ins. Fund	13.1%
Balt. City Comm. College	8.7%
Bus. & Economic Dvlpmt.	17.5%
Comptroller of the Treasury	69.2%
Dept. Asmnts. & Taxation	11.7%
Dept. of Agriculture	29.0%
Dept. of Budget & Mgmt.	DNR*
Dept. of Education	DNR*
Dept. of General Services	38.4%
Dept. of Human Resources	20.3%
Dept. of Juvenile Services	4.1%
Dept. of Natural Resources	23.9%
Dept. of the Environment	43.5%
Dept. of Transportation	18.3%
Dept. of Veterans Affairs	17.5%
Food Center Authority	25.6%
Health & Mental Hygiene	13.0%
Higher Education Comm.	10.0%
Housing & Comm. Dvlpmt.	47.3%
Injured Workers Ins. Fund	25.2%
Judiciary of MD	25.8%
Labor, Licensing & Reg.	9.7%
MD Environmental Service	38.9%
MD General Assembly	28.2%
MD School for the Deaf	19.4%
MD Stadium Authority	22.5%
MD State Archives	14.3%
MD State Police	29.8%
Morgan State Univ.	0.8%
Office of Public Defender	0.0%
Public Broadcasting Comm.	17.2%
Public Safety & Corr.	5.8%
St. Mary's College	21.6%
Subsequent Injury Fund	23.1%
Univ. of Maryland System	20.7%

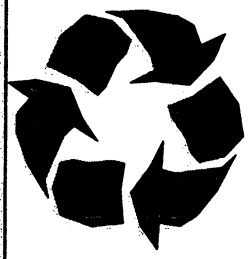
A 20% recycling rate for each State agency is an achievable goal that can be reached with your help. MDE is looking for suggestions from successful All StAR programs so that we can share your improvements with others. Please contact David Mrgich of the Planning and Recycling Division at 410-631-3314 with questions or to share your ideas.

*DNR = Did Not Report

CLOSING THE LOOP

– Virginia Lipscomb

We are all familiar with the recycling symbol. We start the recycling loop when we collect materials for recycling and we "close the loop" when we purchase products made with recycled materials. State agencies have been doing a great job of purchasing recycled paper. We need to take the next step and look for a wider variety of recycled content products. Consider making recycled content part of all RFPs when requesting bids on products. Also, check out these web sites to find recycled products from re-refined motor oil to building insulation to plastic buckets.



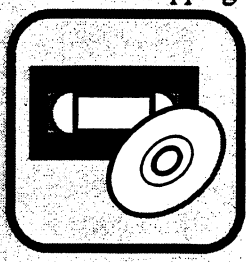
- www.dgs.state.md.us/procure/recycledlist.htm
  - Recycled products already on DGS contracts
- www.epa.gov/epaoswer/non-hw/muncpl/buyrec.htm
  - Environmental Protection Agency information about recycled products
- www.prc.org/rpdirect.htm
  - Lists of state, national, and association recycled content product directories
- www.ecomall.com
  - A database of recycled products and companies
- www.greenorder.com
  - A resource for institutional suppliers and buyers

Purchasing recycled products sustains markets that allow us to divert more raw materials from the waste stream.

[MEDIA, *from page 1*]

Video Tapes

Carpel Video
429 East Patrick Street
Frederick, MD 21701
Phone Number: 800-238-4300
Note: Please label the shipping package with "Attention: Donated Tapes."



CDs

Taylor Science Materials Center
19501 White Ground Road
Boyds, MD 20841
Phone Number: 301-353-0866
Note: Promotional CDs sent by Internet carriers are welcome.

Plastics Recycling Inc.
2015 South Pennsylvania St.
Indianapolis, IN 46625
Phone Number: 317-780-6100

NESAR
Attn: Recycling
426 Ashwood Road
Darlington, PA 16115
Phone Number: 724-827-8172

MRC Polymers
c/o SDM Recycling Program
3307 South Lawndale Ave.
Chicago, IL 60623

For all of the companies listed above, all shipments must be prepaid and are the responsibility of the sender.

The next issue of the All StAR News is scheduled to be published on MDE's recycling webpage in the Fall of 2001.

Glossary of Terms

Active solar heating – A space heating system in which heat from the sun is absorbed by collectors and transferred by pumps or fans to a storage unit for later use or to the house interior directly.

Active solar water heater – A water heating system in which heat from the sun is absorbed by collectors and transferred by pumps to a storage unit. The heated fluid in the storage unit conveys its heat to the domestic hot water of the house through a heat exchanger.

Agricultural by-products – Products developed in agriculture that are not the primary goal of the agricultural activity. Some of these are being used as building materials.

Agricultural fiber – Agricultural fibers (i.e., cotton) are being introduced for use as insulation materials.

Alternative materials and methods code provision – Sections in all existing codes giving guidance for approval or designs, materials and methods of construction not specifically covered by the code.

Asbestos – A mineral fiber that had been commonly used in many building construction materials for insulation and as a fire-retardant. Invisible fibers of asbestos can be inhaled and have been connected to lung diseases and cancer

Battery power storage systems – Battery systems that are designed to store power in batteries that has been generated by solar photovoltaic, wind, micro-hydroelectric, or other site-based power generation systems, as well as to store grid power in some grid-connected power systems.

Bioswale – A shallow trench planted with trees, shrubs, and ground cover that detains and filters stormwater before allowing it to infiltrate the groundwater system.

Borate-treated wood – Borate is a mineral product from borax. Treating wood with borates has been done in New Zealand and Australia for many years (for insect and moisture protection). Commercial applicability is being researched in the U.S. with a major effort geared toward preventing the borates from leaching out in the presence of moisture. Borates are commonly used to treat cellulose insulation.

BTU (British thermal unit) – Unit of heat; can be used to measure heat output or the energy contained within a material.

Built environment – All human-built structures.

Carbon monoxide (CO) – Colorless, odorless gas resulting from incomplete combustion. Gas stoves, fireplaces, kerosene appliances, tobacco smoke and automobile exhaust are potential sources.

Cellulose – Fibrous part of plants used in making paper and textiles, which in turn may be made into building products.

Cellulose insulation with borates – Cellulose insulation made from recycled newspaper treated with borates to provide fire and vermin protection. Most cellulose insulation available now use chemical fire retardants as opposed to natural borates. The chemicals now used can cause allergic reactions.

Cementitious – Having properties of cement. Cement is the primary binding agent in concrete.

Cementitious foam insulation – Magnesium oxide-based material blown with air to create an inert effective insulation. It may be especially helpful for people with chemical sensitivities.

Certified wood – Wood that has been produced through a process that has been approved and overseen by a third party agency, integrating ecological values into the extraction and industrial processes.

CFC/HCFC – Chlorofluorocarbons and Hydrochlorofluorocarbons, industrial chemicals used as refrigerants, cleaning solvents, and aerosol propellants and in the manufacture of plastic foams. Major contributors to the destruction of stratospheric ozone. HCFC is 1/20th as potent as CFC in its ozone-destroying capacity. Current ozone damage is generally attributed to CFC's released 10 to 15 years ago. Twenty percent of ozone damage is caused by CFC's in insulation.

Charrette – A design workshop, usually involving the architect, the owner, users and/or the public, consultants, etc. Typically, a charrette is done in the early schematic phase of design to get at the big issues and reach agreement on the principles of the project.

Clerestory – A daylighting strategy that allows natural light into a building interior through a raised section of roof with vertical glass. Shading of the glass allows light in while minimizing heat gain.

Code users – People who comply with codes, such as builders, architects, engineers, designers, consultants, landscape architects, materials manufacturers or suppliers, building owners, owner-builders and others who have sought code approval for green building projects.

Code officials – People who ensure code compliance, such as building officials, plans examiners, inspectors, fire officials, planning officials, code consultants, model code organization staff, and others in the position of regulating building.

Compost-connected disposal – A disposal that grinds food waste into a container where it is separated from the water rather than flowing into the water system. The contained food waste can then be composted.

Compost system – A system that converts organic waste (food, plant material) into a rich fertilizer.

Cradle-to-cradle – An understanding of the life cycle of materials and their embodied energy that accounts for the original extraction or harvest of material to its end-life and eventual reuse.

Cradle-to-gate – An understanding of the life cycle of materials and their embodied energy that accounts for the original extraction or harvest of material to the beginning of its first use.
Daylighting **–** Using natural light to full advantage to minimize the need for artificial lighting during the day. Common daylighting strategies include the proper orientation and placement of windows, use of light wells, light shafts or tubes, skylights, clerestory windows, light shelves, reflective surfaces, and shading, and the use of interior glazing to allow light into adjacent spaces.

Drip irrigation – Above-ground, low pressure watering system with flexible tubing that releases small, steady amounts of water through emitters placed near individual plants.

Domestic hardwood – Deciduous trees that grow in the United States. This is the only type of wood in the U.S. where on a general scale the regeneration (production of new trees) easily exceeds the removal rate.

Earth-sheltered design – Design of houses that are parti ally or totally below ground, either as a result of digging into existing topography or filling over parts of the structure. Constant temperature of the soil improves energy efficiency, and can be beneficial for use of hilly sites by decreasing maintenance and environmental impact.

Ecoroof – A roof covered with soil mix and vegetation, which absorbs stormwater, detaining it from sewer systems.

Ecosystem – A complex and interdependent set of natural conditions and elements. Habitat survival depends directly and/or indirectly on ecosystem health.

Embodied energy – Total energy invested in bringing a product or material into existence involving resource extraction, processing, manufacturing, transportation, and installation.

Energy recovery ventilator (ERV) – Draws stale air from the house and transfers the heat or coolness in that air to the fresh air being pulled into the house. This can help reduce energy costs while diluting indoor pollutants and even decrease or increase humidity as needed.

Exterior grade plywood – Uses phenol formaldehyde (a toxic substance) as an adhesive which outgasses in much smaller amounts compared to urea formaldehyde, which is used in interior grade plywood and particle board.

Formaldehyde – A colorless, pungent smelling material used as an adhering component of glues in many wood products. Can cause respiratory problems, cancer, and chemical sensitivity.

Graywater – Water that has been used within the home and/or roof runoff, excluding kitchen sink and toilet water. It can be captured, treated, and used as a non-potable water source.

Green building – The process of designing and constructing buildings in ways that minimize their negative ecological impacts. Includes concern for the full life cycle impacts of buildings from the acquisition of resources and materials, transportation, processing, manufacture, distribution, installation, use, maintenance, repair, and ultimate disposal. Green building usually also includes efforts to ensure energy efficiency, material and resource efficiency and healthy and safe indoor environment in terms of the toxicity of materials and indoor air quality.

Green development – A development approach that benefits or has minimal negative impacts to the local and larger environment, uses resources efficiently (including community resources), and is sensitive to the existing local culture and community.

Green materials, products, and systems – Those with some or all of the following characteristics: durability, low-maintenance, low-embodied energy (energy required to acquire, transport, manufacture and install), locally available, made from recycled or renewable resources and can be recycled or renewed, low toxicity, produce little pollution or waste, and have minimal negative ecological impacts.

Gypsum/Cellulose – An interior wallboard product that uses cellulose from recycled newspapers with gypsum and perlite.

Harvested rainwater – Rain that falls on a roof or yard and is channeled by gutters or channels to a storage tank.

Healthy home – A home designed to provide its inhabitants with clean air and water.

High-quality duct system – A method of designing and installing ductwork that avoids potentially significant heating and cooling losses and potential health hazards caused by depressurizing or pressurizing a house.

Insulated masonry – Reinforced (rebar and grout) cementitious bricks integrally insulated with Expanded Polystyrene (EPS) Polyurethane or other insulation material.

Integrated design – An approach where the design of each system takes into account and balances the design of other systems. For example, improvements in solar orientation and thermal

envelope of the building, combined with proper use of daylighting, allows the HVAC systems to be downsized, saving energy, materials, maintenance, equipment costs, etc.

Kilowatt-hour (kwh) – A measure of electric usage equivalent to use of 1,000 watts for one hour.

Lead – A harmful environmental pollutant typical in older homes with lead-based paints and in the lead solder used in plumbing. Lead is toxic to many organs and can damage the brain, kidneys, and nervous system.

Least-Toxic – Characteristic of building material in which urea formaldehyde is not present and/or VOC contents are minimal and/or water-based constituents are used.

Life Cycle Assessment (LCA) – An objective process to evaluate all the environmental burdens of a product or process through its entire existence, including extracting and processing raw materials manufacturing, transportation, distribution, use and maintenance, recycling and final disposal.

Low-e(missivity) windows – Energy-efficient windows that allow light to pass through their construction but block the flow of heat.

Low-hanging fruit – Strategies that are not difficult to employ either because they make sense as part of the basic program of the project, or because they clearly offer more benefit than cost.

Methane (CH_4) – An odorless, colorless, flammable gas that is a major constituent of natural gas. A more powerful global warming agent than carbon dioxide.

Microclimate – A unique set of climatic conditions caused by landscape/building features.

Micro-hydroelectric systems – Systems that generate electricity by harnessing the flow of a stream or some other small-scale flowing water source.

Native (plant) species – Species that are well adapted to local climatic conditions and can flourish with little to no maintenance or watering.

Natural linoleum – Linoleum in which cork is the primary material. Cork is from the bark of the cork tree and is harvested without destroying the trees.

Naturescaping – Landscaping that features native plants and water-friendly gardening practices. Reduces water usage, can eliminate use of harmful chemicals, attracts beneficial/interesting wildlife, and requires very little maintenance.

New Urbanism – A design movement that advocates for urban developments which encourage walking and transit as an alternative to automobile usage.

Nitrogen Oxide (NO) – A colorless, poisonous gas, a by-product of gas combustion.

Nuclear waste – The radioactive by-products and contaminated materials produced in nuclear powered electric generating facilities.

Off-gassing – Emission of chemical compounds (VOCs, e.g.) into the air, usually from newly installed building materials and finishes.

Old growth – Wood format trees found in mature forests. In many cases the trees have never been exposed to logging operations.

Organic waste – Natural materials, such as food and yard waste that decompose naturally.

Particulate matter – Solid material that escapes from combustion processes.

Passive design – Building design and placement that allows the use of natural processes such as radiation, convection, absorption, and conduction to minimize energy costs.

Passive cooling – Building design that permits increased ventilation and retention of coolness within the building components, with the intention of minimizing or eliminating the need for mechanical means of cooling.

Passive heating – Building design that allows natural thermal energy flows such as radiation, conduction and natural convection generated by the sun to provide heat. Conceptually, sunlight is let into the house to heat a thermal mass (such as a slab floor), which in turn radiates the heat back into the house when needed at night.

Passive solar design – Passive solar design of buildings maximizes the use of the sun for heating during cool weather and minimizes solar gain from the sun in warm weather. Design features typically include south-facing orientation of windows for winter sun (in the northern hemisphere), general east-west orientation of the building, roof and overhangs that provide shade from the summer sun but allow the winter sun through the windows, and thermal mass in the interior to store heat or coolness and maintain more constant temperatures within the structure.

Passive solar water heater – A water heating system that does not require mechanical pumps or controls to create hot water for domestic use.

Passive ventilation – Reliance on convective air flows that result from the tendency of warm air to rise and cool air to sink, as well as taking advantage of prevailing winds.

Perlite – A natural volcanic glass that expands with heat and transforms into a fluffy form that can be used for insulation purposes.

Permaculture – A design system that integrates landscape and building issues. Emphasizes low maintenance, edible landscaping, and single design features (including plants) that fill more than one function.

Pervious paving – Paving material that allows water to penetrate to soil below.

Photovoltaic – The process of converting sunlight directly into electricity. The electricity can be used immediately stored in batteries or sold to a utility.

Pressure-treated wood – Wood chemically preserved to prevent moisture decay. The process involves environmentally problematic chemicals, as well as health hazards from contact with the material.

Programmable thermostat – A mechanical or electronic device that uses user-defined settings to regulate the temperature setting and time of day operation of heating and cooling systems.

Proper ventilation – Ventilation that expels all combustion gases to the outdoors.

Radiant barrier – A layer of metallic foil that reflects thermal radiation without transferring heat to other materials.

Radon – A radioactive, colorless, odorless gas that occurs naturally in the earth. Trapped in a building, its higher concentrations can increase risks of lung cancer.

Rain sensor – A device that measure rainfall and prevents unnecessary irrigation with an automatic controller.

Rammed earth – A building technique for exterior wall where earth is "rammed" (or pressed down) between forms. Certain mixtures of moistened earth used in this technique harden under pressure and form a strong solid wall which is then covered by a waterproofing coat.

Reconstituted – The process of taking small pieces of material and binding them together to form a larger item.

Recycled – A material that has been made from previously used materials of the same type.
Renewable – A resource reproduced in a short time span, relative to its life in human use.

Run-off – Water from rainfall or irrigation that is allowed to flow off the property. Run-off can be thought of as a lost resource and a contributor to non-point source pollution.

Soaker hose – Low-flow watering device with small holes throughout the surface of the hose. Good for plant beds and gardens.

Soil moisture sensor – A device attached to an automatic irrigation system which monitors the water available to plants and allows irrigation only when the soil moisture level drops below the desired level.

Sludge – The sediment extracted from wastewater.

Solar photovoltaic systems – Solar photovoltaic systems harness the energy of the sun and convert it into electricity. This electricity can be used as either direct current (DC) power or alternating current (AC) power if an inverter is used.

Solar thermal water heating – Solar thermal water heating uses the energy of the sun to provide or supplement a building's hot water supply. This can be for both domestic hot water and for building heat, usually through radiant heat systems.

Straw bale technique – A building technique for exterior walls where straw (not hay) bales are stacked, reinforced and interlocked in a manner that forms a thick, highly insulated wall.

Straw-mud – Building technique for exterior walls in which earth material is mixed with straw, moistened and pressed between forms where it hardens into a strong wall. It is covered with a waterproofing plaster system.

Sulfur dioxide (SO_2) – A colorless, irritating gas that is a primary cause of acid rain. A by-product of coal combustion.

Sustainability – Meeting the needs of the present without compromising future generations' abilities to meet their own needs.

Sustainably harvested – Wood and other biotic materials cut at a pace and by means that do not compromise the forests' ability to function as a healthy ecosystem.

Thermal chimney – A section of a building where solar heat or thermal currents are controlled in a manner that stimulates an updraft and exhaust of heated air. This draws in fresh air to occupied areas of the building through open windows or vents and is a passive cooling method.

Thermal envelope – The shell of a building that essentially creates a barrier from the elements. A highly insulated thermal envelope allows maximum control of interior temperatures with minimal outdoor influence.

Thermal mass – Materials that absorb heat or coolness and store it for long periods of time. Water and masonry materials can provide thermal mass. Such materials react slowly to temperature variations and are important aspects of any passive heating or cooling system.

Tropical hardwood – Wood products harvested from tropical rain forests.
U-value – A unit of thermal resistance measuring heat conductivity through an assembly rather than a single material. Inverse of R-value.

Vapor retarder – A continuous plastic membrane which surrounds the entire thermal envelope of a house and prevents moisture penetration into the wall cavity.

Volatile organic compounds (VOCs) – A large family of chemicals including all organic compounds containing hydrogen and carbon that vaporize at room temperature and pressure.

Waste heat – Heat that escapes to the atmosphere during combustion processes.

Wastewater treatment – Water that is discharged from homes and businesses from sinks, toilets, washers, showers, etc. It is treated through a series of separation and aeration processes.

Water budget – Calculated amount of water a household should use based on the type and number of fixtures, landscape requirements, and size of the family.

Water harvesting system – A system to collect rainwater for use after a rain event.

Watershed – Area of ecosystem(s) bounded by the highest topographic points and focused around where water flows, often streams.

Watt – A unit of power indicating the rate at which work is done. The faster an agent can do work, the more powerful it is, and the higher its wattage.

Whole-house fan – A fan typically centrally located in the ceiling of the house. It pulls house air up into the attic area where it vents to the outdoors.

Wind Machine – A machine that generates electricity by the wind turning a generator-connected wind propeller.

Xeriscape – Landscaping method that requires minimal amounts of water in addition to normal rainfall.